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Trade Enquiries.

Managing Editor—Mr. K. M. Banerjee.

INDUSTRY

A Journal of Technology Handicrafts & Commerce

Vol. XV. Calcutta, April, 1924 No. 169

Industrial Democracy.

TO THE very pertinent question "what has Industry achieved during the fourteen years of its existence ?", we would simply answer, "it has founded an industrial democracy unique in the economic history of India." What with our honest effort, what with your good wishes, what with the spirit of times, what with the industrial renaissance India is witnessing, Industry is to-day the only representative institution comprising all the industrial elements in the country. And like a true republican institution Industry has its representative in every part of India, Burma and Ceylon in the person of its reader. Slowly but steadily a class of enterprising people has been enlisted on its electoral roll.

That every reader of Industry is offered ample scope in its direction and government, that the interests of every reader are its prime concern —according to the fundamental tenets of a democracy—will be manifest by even a cursory examination of contents of this Journal. Only those subjects are treated in the articles which are requisitioned for by the readers and are uppermost in public mind. Those difficulties are removed which are encountered by them and which are typical. Schemes and estimates for starting industries are submitted for the welfare of those on the threshold of their career. The questions asked of us for reply cover a wide range of ground.

Thus from cover to cover in the pages of Industry are expressed the opinions of its readers, their grievances are ventilated, their aspirations are nurtured, their achievements are chronicled. Its pages are moreover open for the free discussion of the pros and cons of this industry and that. In short Industry embodies the minutes of proceedings of the industrial democracy founded by it and the general policy of which is dictated by the constituents.

In order that the deliberations of the people engaged in the industrial field as voiced through this organ might carry more weight, we wish still farther to extend the franchise and for that purpose we request our readers to apprise their progressive friends of the fact and ask them to avail themselves of the opportunities thus offered for *their* benefit.

INDIA'S INDUSTRIAL PROGRESS.

Benzol Production in India.

The first plant in India for the recovery of benzol has been installed in Jherria. It is intended to market the rectified benzol as motor spirit.

Paper Making in India.

The paper making industry in India did not make any appreciable progress before the War but when the paper supply was curtailed during the War, attempts were made to improve the local manufacture to meet the increased demands of the country. But the high cost of imported wood pulp and the heavy price paid for raw materials and chemicals impeded the development of the local industry. Recent investigations, however, have indicated availableness of raw materials in the country itself in sufficient quantity to ensure the successful development of the industry and the improved conditions of foreign market have to some extent reduced the price of chemicals and an attempt to stimulate the progress of the local industry under expert guidance and sound financial organisation may now help much to secure profitable returns. East and West Bengal and Bombay have already established paper mills which supply but a fraction of the annual cosumption of paper in the country. Recently one or two schemes have been mooted in Northern India for the manufacture of paper and, indeed, a company has been started in the Punjab. which hopes to utilise Babbar grass and to generate its own hydro-electric power. In the South investigations have revealed the existence of great facilities for the growth and development of this industry in Madras Presidency offering immense possibilities for enterprising capitalists.

Forestry Organization in Ceylon.

The question of forestry in Ceylon has lately been receiving a great deal of attention from the Empire Forestry Association and other authorities, and at last the Government of Ceylon has appointed a committee to suggest amendments to the present forestry laws which shall assist the development of the forest resources of the island. For some time there has been a growing scarcity in Ceylon of jack timber suitable for building purposes. When the Kantale and other great forests of the island are systematically exploited, the finest materials will again be available. Reafforestation affords great possibilities, and mahogany could be grown very profitably in certain parts of the island. Australian and Indian timbers for building purposes are becoming increasingly popular, largely owing to the scientific seasoning they receive which makes the wood attractive and durable. At present Ceylon imports annually from Western Australia about 1,000 tons of jarrah timber, most of which is in the form of railway sleepers. Burma, India and Siam send to Ceylon about 2,000 tons, 200 tons, and 100 tons respectively of teak, while of other timbers the annual imports are about 300 tons from Siam, about 200 tons from Western Australia, and a small quantity from Burma, the Straits Settlements, and the Philippines.

Potato Starch.

THE potato is largely used in making starch. The quantity of starch not only differs in the different varieties of potato, but also on the nature of the soil, the mode of culture, and the season of the year. Starch is not distributed equally over the tubers, but exists in largest quantity towards the exterior. In large potatoes the centre is often quite transparent, containing only cellular tissue and water.

In the manufacture of starch from potatoes the first process is to soak the tubers in water for about 6 hours, which softens the epidermis, and assists in its removal. They are then passed through a hopper into a cylindrical cage, and washed by the revolution of the case in a trough of water while a jet of water falls on the cage. All the earthy matter and much of the skin are thus removed. The potatoes are now passed into a trough, and elevated by means of an endless chain with buckets attached to a rasping-machine where they are passed under a circular raps, a common form of which is a wooden drum covered on its circumference with sheet iron roughened outside by punching numerous holes from the inside. The rasp revolves from 900 to 1000 times per minute, and a stream of water plays on its surface to prevent it from becoming clogged, and to wash off the pulp to which the potatoes are reduced by its action. The pulp is conducted into a cylindrical sieve of wire gauze, formed of 3 pieces of unequal diameters, and made to revolve by a winch. These cylinders are supplied with fresh water which, with the starch in suspension forming a milky liquid, falls into a trough, while the wasped pulp is received in a separate vessel.

The starch-water when received into the depositing vat quickly deposits its starch, and forms a coherent layer, from which the liquor is poured off. The potatoes, however carefully washed always contain a little sand, which is now found in the first deposit of starch, and is separated by washing and decantations.

On stirring up the starch with water the sand subsides almost immediately and on running off the milky liquid into a separate vessel, a new deposit is formed free from sand. This deposit is covered with a light albuminous matter, which is removed by washing. The starch is then put upon cloths to drain, the cloths being contained in small trays with perforated bottoms, and when most of the water is thus got rid of, the trays are placed on a floor composed of pieces of well-dried plaster, which quickly absorbs the water, and leaves the starch as a firm, friable body, which is sent to market under the name of green feonla. It contains about 38 per cent of water, and is used in the preparation of dextrine and starch syrup, etc. To obtain the starch in a dry state it is left for 24 hours on the plaster floor, then cut up into flocks, and broken into lumps, and placed on shelves in a drying house. The pieces are turned over occasionally, and when they begin to crack the drying is completed at a hot stove, at a temperature of from 55° to 58°C.

with occasional stirring, to prevent the formation of small hard lumps, and when dry it is bolted through a silken sieve. The substances left on the sieve are ground under a roller, and again sifted.

This kind of starch is hygrometric, and therefore not well adapted to the stiffening of linen; it generally contains about one-fifth its weight of moisture, but when saturated, about 23 per cent. It is often adulterated with gypsum chalk, and argillaceous matters, which are easily detected by incineration. Potato starch is sold under various names for the purposes of food. It forms the basis of the nutritive farina for which purpose the starch is carefully prepared, coloured and aromatized. A variety of tapioca is made by heating moistened potato starch on a copper plate to nearly 212°. Some of the granules of starch burst, agglomerate, and form small, hard and irregular grains which resemble true tapioca. Again a little potato strach or potato meal added to wheaten flour is thought to improve the quality of bread. Potato starch is also used in making grape or starch sugar and British gum or dextrine for the calico-printer. It is also largely used as a substitute for glue in making size for paper, for which purpose it is mixed with a small quantity of a solution of resin with carbonate of soda in water.

The starch water from which the potato starch is deposited is useful for the purposes of irrigation, it contains an azotised matter and small particles of pulp. The marc of the pulp is deprived of half its water by expression, and is then used as food for cows and sheep. If the quantity be too large for immediate consumption, it may be dried at a moderate heat, when it will keep a year or more, and is fit for use on the addition of water. The practice of keeping it in heaps with salt is a bad one, as it is apt to ferment, and thus becomes valueless.

Tobacco Preparations.

SNUFF.

(1)

Select best tobacco leaves such as *moti* and clean them from dirt. Soak them in rose water and dry them in the sun. When crisp powder them and shift through a fine sieve. Add a few drops of oil of Hena and bottle. The powder must be excessively fine.

(2)

Take clean tobacco leaves. Bake them in a very slow oven on an iron plate. Powder finely when crisp. Add a few drops of otto of rose and of khuskhus.

ZAKDA.

Take some tobacco leaves and wash them in water. Then dry them in the sunshade but not too crisp. Pound them in mortar and pestle to cut them in fine pieces. Then for every lb. of this add :

Cinnamon oil	20 mm.
Clove oil	10 ,,
Rose otto	10 ,,
Neroli oil	2 ,,

Mix well. Fine pieces of real gold or silver leaves may be incorporated to heighten the effect. Put into phials with tight cork. Other ingredients such as musk and scents as that of cardamom may be added for a product of better quality.

KASHI SURTI.

Take one pound of any best variety of tobacco leaf such as *hingli*, clean the leaves; soak them in water in an earthen ware or enamelled vessel for a few hours and then pound them. The colour of the water will become brownish on account of the essential principle of tobacco coming out. Strain and preserve the decoction in a separate vessel and grate down the softened leaves to a pulp. Boil the held-over decoction and mix the above-grated mass. Continue boiling until a pasty mass results.

Add to it :

Nutmeg	1	oz.
Betelnut powder	1½	,,
Cinnamon powder	3	,,

Mix well and add :

Oil of Peppermint	10	mm.
,, Coriandra	5	,,
Otto of Rose	5	,,
Essence of Musk	10	,,

Make into small globules, with tragacanth, if necessary.

"SEN SEN."

Sen Sen is a proprietary article the preparation of which is a trade secret. But a product like this may be obtained with the recipe :—

Extract of Liquorice	4	oz.
Menthol	1½	dr.
Powder Cinnamon	4	oz.
Balsam Peru	4	dr.
Tragacanth Powder	½	oz.
Oil of Neroli	4	mm.

The first five ingredients are pounded together which will result in a thick paste. Then add the oil and make into globules.

This preparation cleans the throat, destroys the foetid odour of mouth, prevents dental diseases, and adds to the flavour of betel leaves.

TAMBUL BIHAR.

This is also a proprietary article for use in chewing betel to which it imparts its characteristic aroma. To obtain a similar product the following recipe may be suggested.

Sambal (root of ferula)	2	oz.
Betel-nut dust	2	,,
Jastimodhu powder (Glycyrhiza Glabra)	4	,,
Cardamom (minor)	3	,,
,, (major)	2	,,
Carraway powder	1	,,
Cinnamon bark	1	,,

Powder the ingredients separately and mix.

Add to the mass :

Otto of Rose	5	mm.
Musk	2	gr.

and put into small tin pots.

RICE INDUSTRY OF INDIA.

Introductory.

Habitat.

RICE is one of the most extensively diffused and useful grain of crops and supports a great number of the human race. Its cultivation prevails in all the river valleys and on all the coasts of Eastern and Southern Asia : it is a common article of subsistence in various countries bordering on the Mediterranean : it is grown in the Japan Islands, on all the sea coasts of China, the Philiphine and other large Islands of the Indian Archipelago, in Ceylon, Siam, India, on both shores of the Red Sea, in Egypt, on the shores of the Mozambique channel, in Madagascar. in some parts of Western Africa, South Carolina and Central America. India, however, occupies a predominant position in respect of the world's production of rice and trade in rice.

Rice has been called the greatest of all cereals. It possesses the advantage attending wheat, maize, and other grains of preserving plenty during the fluctuations of trade and is also susceptible of cultivation on land too low and moist for the production of most other useful plants. Although cultivated principally within the tropics, it flourishes well beyond, producing even heavier and better filled grain. The chief variety of this cereal is cultivated throughout the torrid zone, wherever there is a plentiful supply of water.

World's Cultivation.

There is every reason to believe that the world can enormously increase its rice crop, which at present amounts to about 2,500,000,000 to 3,000,000,000 bushels. Most of the land in the tropics is undeveloped. Extending around the world at the equator and for a considerable distance north and south of it, almost everywhere that land appear, is a zone of dense forests, flourishing in the rice climate. This great belt is almost untouched. The extension of rice growing by machinery in the temperate zone may be duplicated in the torrid zone.

By far the most important rice-growing region of the world is Asia for excepting in the northern portion of this continent, rice is universally cultivated. Three-quarters of all the rice that comes into the markets of the world is grown in British India, Bengal producing the greatest amount. Siam, China Japan, Java, the Straits Settlements, Ceylon, the Hawaiian Islands, and other Asiatic countries, all produce large quantities of rice, although not sufficient in every case to supply the local demand.

In Africa the chief rice-producing country is Egypt, owing to the very favourable conditions prevailing in the Nile valley, and the natural annual flooding of the lands. The French Colonies of Senegal, the French Sudan, Madagascar, and Reunion cultivate it extensively and rice is also grown in Mauritius, and along the coasts of both East and West Africa. On the whole, however, Africa does not possess such large tracts of land naturally suited to as occur in Asia.

Rice is of minor importance in Australia, although grown to a considerable extent in New South Wales, Queensland, and in the Sandwich Islands among other places. In Europe, Italy is the chief seat of rice cultivation, and is the only country on the Continent in which the production is greater than the local demand. Spain, Portugal, and Greece follow next in order of importance, whilst even in France, in the valley of the Rhone, the plant is cultivated. In North America rice is an important crop in the United States, the centres of production being Louisiana, Georgia, and South and North Carolina.

HISTORICAL.

The cultivation of rice extends back into the dim past, and there are no authentic records as to when it first began. Its original home was in South-Eastern Asia and it has been cultivated for many ages, and introduced into almost every part of the warm-region of the world, so that it is extremely difficult to be certain in which country exactly it was first found or cultivated by man. Indeed in this country rice has been cultivated from time immemorial. Theophrastus mentions that rice was grown there, and the Greeks probably first became acquainted with it during the Indian expeditions of Alexander the the Great.

There is conclusive evidence to show that the Aryans were the first to cultivate rice in the dawn of civilization while numerous references in Vedic hymns to the life-sustaining properties of rice prove beyond doubt that it was the mainstay of the settlers of Hindostan at the remote age of history. That rice was already held in high esteem in the classic period of India is substantiated by the circumstances of its mention in the Epics. One of the the earliest mention of rice cultivation is also connected with China. It is said that a ceremony was established in that country about 2800 B. C. by the Emperor Chin-nung, in which the sowing of five kinds of grain is the chief observance The reigning Emperor himself has to sow the rice, but he may delegate the sowing of the other four kinds to the princes of his family.

It was introduced at an early period into Syria, Egypt, and other parts of Northern Africa. In more modern times rice has spread into Spain, France, and Italy. The plant is believed to have been introduced into America in 1647.

BOTANICAL.

Rice is an annual grass belonging to the tribe Oryzeae of the natural order of Gramineae. It grows from 2 to 10 or more feet in height ; the panicles vary from 8 inches to a foot or even more in length, and become drooping ; the fruit or grain is enclosed in but does not adhere to the poles.

Botanical writers have described twenty species as belonging to the genus

Oryza, but they add that scarcely five of these can be well distinguished, and that even the five more easily recognised forms are very generally viewed as but varieties of one species, viz., O. Sativa, Linn. The chief forms of that species are inhabitants of the East Indies, though some are indigenous to Australia also, and most of them have been widely cultivated from very ancient times, throughout the warmer regions of both hemispheres. In fact, they are now almost naturalised in America and Africa. Three species only are enumerated by Lindley—Oryza Sativa, the common rice, a native of the East : O. latifolia, a species having its habitat in South America ; and O. Nepalenses, common in Nepal. But there are a host of varieties known in the East Indies ; which however, may for all practical purposes be resolved into two kinds—the upland or mountain rice and the low land or aquatic species.

It would appear paradoxical, nevertheless, it is true, that American rice, though originally imported from the old world, is now much the finest in quality. Indeed it is noted for its very superior quality and the Carolina rice is magnificent in size, colour and clearness. Owing to the above facts efforts have been made from time to time to introduce several of the American varieties into the Madras Presidency and several of the Himalayan rices into Lower Bengal and Oudh. In fact active steps have been taken to improve both the quality and the yield of the rice crops all over the country.

SPECIES OF RICE.

The rough rice (paddy) as it leaves the thresher consists of the fruit or grain, surrounded by a closely enveloping scaly bract, known as the husk, hull or shude. The grain itself, is composed of an outer skin, which consists of the fruit wall and seed coat fused together, enclosing except at one end where the germ is situated, a layer of cells rich in proteins, within which, and forming the bulk of the grain, is the starchy portion of the endosperm.

Speaking generally, rices may be grouped by their colour, size, or shape, or according as they are awned or awnless. The colour of the husk or enclosing glumes gives, however, no positive indication of the colour or shape of the contained grain, so that a classification as to colour and shape, etc. would have to first take into account the peculiarities of the glumes and then of the grain.

Some forms of rice are scented, while the majority have no smell whatever. Scented rices are common, for example, in Orissa, Thana, Behar, etc. and are much prized by certain classes of people. In Burma amongst many high class rices, a grain is grown which, while largely used for industrial purposes, is regarded as unwholesome as an article of food. Certain grains in Southern India are of deep red colour underneath the husk.

Some curious specimens and varieties of rice are to be met with, which are grown without irrigation, at elevation of three thousand to six thousand feet on the Himalayas where the dampness of the summer months compensates for the want of artificial moisture.

If exhaustive collection were made in all the provinces of India, the total number of named, cultivated rices might have been found to be little short of 10,000,

Cultivation.

Rice is the premier crop of India both as regards area and the value of its outturn. On an average 35 per cent of the total cultivated area of India is under rice ; in Assam nearly 80 per cent., in Burma 74 per cent., and in Bengal 70 per cent.

The finest varieties and the largest yields of rice are produced in tracts which, during the growing season, afford a moderate degree of sunshine and a damp warm atmosphere. Rice is therefore the staple crop in all areas of heavy and assured rainfall ; but good crops are produced in districts which receive moderate or even light rain, when this can be assisted by sufficient irrigation. The normal rice cultivation of India exceeds 120,000 square miles.

VARIETIES OF PADDY.

The varieties of paddy, are exceedingly numerous, and the peasants know the conditions of soil, cultivation, climate, and water supply most suitable for each of the several local kinds. These vary from very fine to very coarse, with numerous intermediate varieties. Most of the finest grades are grown from transplanted seedlings, and have long, thin, sharp-pointed grains, which are yellow or golden yellow in colour. The husked rice is nearly white, very translucent, long, and thin. The finest rice is also fragrant or scented. The grains of coarse varieties are usually large, full-bodied, deeply scored, and dark coloured, while the husked rice is usually thick and opaque. Its colour may be white, creamy white, pale brown, or reddish brown.

There are also early, medium, and late ripening varieties of paddy. The last are generally the finest and need a full supply, but a small depth, of water throughout the growing season. Some coarse long-stemmed varieties thrive on land which is liable to be flooded, and others are adapted for salt deltaic land re-claimed from the sea. The head of grain varies from a large drooping to an erect small one.

RICE-CROPS.

The several rice-crops of India may be termed spring, summer, autumn, and winter-rice, from the seasons in which the different varieties are harvested. Winter-rice is the most important, constituting as it does about three-fourths of the entire amount. The several rice-crops bear different names in different parts of India.

Spring-rice is sown, according to locality, from September to February, and reaped from March to June. Summer-rice is sown from May to July, and reaped from September to October. Autumn-rice is sown from April to July, and reaped from August to November. Winter-rice is sown from March to August, and reaped from November to January.

In parts of Madras, on canal irrigated lands which are fertilized by silt, three crops of rice are often raised in a year. In most other parts of India rice beds yield only one crop of rice anually, but another crop, usually a pulse, is taken when conditions are favourable. Outside Madras rice is generally a *kharif* crop, sown as early as possible after the south-west monsoon sets in. In Bengal, however, there are too main harvests the *aus* or early crop being sown on comparatively high lands during the spring showers, while the *aman* crop is sown in lower fields in June and July.

Preparation of Fields.

Rice is everywhere grown in embanked fields. Level or nearly level beds are necessary, because rain or irrigation water must be impounded and kept at a height which should vary as the crop grows. At no time should more than two thirds of the plant be immersed where fine short stemmed varieties are grown.

The best soils for rice are clays or clay looms of fair depth. The crop luxuriates on soil through which water can percolate with freedom, and over which it flowers slowly ; but in Northern India it is grown successfully even on clays which are almost impervious.

Many rice-fields which receive much silt with irrigation water are rarely or sparingly manured. Otherwise a good crop is exhausting, and liberal manuring is generally necessary to produce a valuable variety. In places green manuring is practised, for which purposes *san* (crotalaria juncea) is sown thickly with the first fall of rain. In Madras and the Coast districts of Bombay, the green leaves and twigs of certain trees are used as manure. Castor-cake is sparingly used in places ; but by far the commonest applications are ordinary cattle dung, and tank mud where available.

Sowing.

Rice is sown in three ways—broadcast, by drill, and by transplantation from a seed-bed where it has been sown broadcast. As a rule the first method is practised on inferior soils or where labour is scarce. Rice is drilled in some districts of Bombay, but this system is not uncommon. The third method is much more usual than the others, and is less risky. Broadcast or drilled rice requires 80 to 120 lb. of seed per acre, while the seed rate of the transplanted crop varies from 30 to 80 lb. per acre.

The seed-beds are highly manured, sheep or goat droppings being a favourite application. The tillage should be careful, and is often accomplished by hand implements. The seed is sown very thickly in fine tilth with the first fall of rain. In the heavy rainfall tracts of Bombay the seed beds are subjected to a process called *rab*. Cow-dung, brush wood, dry leaves, and coarse grass are spread in a thick layer over the surface and then burnt, the seed being sown in the fine earth and ashes. No other manure is applied. The seedlings come up strong, with few or no weeds. A seed-bed should supply seedlings sufficient to transplant from six to ten times its own area.

If the seedlings grow unchecked in the seed-bed they are ready for transplanting in four to five weeks, when they are 8 to 10 inches high. The cultivation of the general area begins when the soil is well soaked, and should be complete by the time the seedlings are ready. Each rice-bed (*kiari*) should be twice ploughed when well soaked with the first fall of rain ; and afterwards, when the seedlings are nearly ready for transplanting, it should be puddled into a thin mud by further plunging and trampling of the cattle.

Transplanting.

In removing the seedlings from the nursery care must be taken not to damage them, and the seed-beds are flooded so that they may be easily uprooted. The roots are washed in the water, and the seedlings are tied into bundles and carried to the field, where they are planted by hand, the root ends being forced into the soft mud. About four seedlings are planted together, at intervals of 6 or 8 inches, the regularity and deftness with which work is done being astonishing. In a week the seedlings get rooted and regain a healthy green colour. Weeding is necessary, but little is required when there is sufficiency of water. If the field has not already dried up, the water should be drawn off about ten days before the crop is ripe.

Broadcast and drilled rice receives in Peninsular India a considerable weeding. Superflous seedlings are removed in places, and vacancies filled up. A curious system of cultivating rice prevails in parts of the Central Provinces. The seed is sown thickly broadcast in the *Kiaris*, and a plough is worked among the seedlings when about 10 inches high, with the result that many are uprooted and the weeds disturbed. The latter are then removed and the rice seedlings take root again in the mud. This system, known as *biasi*, has some of the advantages of transplantation.

Harvesting and Threshing.

The field should be comparatively dry when the rice crop is harvested; but in Bengal this is sometimes impossible, and the reaped crop has then to be carried laboriously in head-loads to be dried in the sun on higher ground. Early varieties of the *kharif* crop ripen in September and October, and the late varieties in November and December. The crop is cut with a sickle near the ground and laid in open bundles of sheaf size. These get dry in a few days, and are then tied into larger bundles and carried to the threshing floor. The grain is threshed by beating on a board or log of wood, placed over a large cloth so spread out as to catch the grain as it falls. A small bundle is beaten at a time and a few vigorous strokes separate most of the grain. The crop is also trampled under the feet of oxen and in this way all the grain can be separated. The straw when threshed on a board as described makes excellent thatch, but poor fodder.

The yield in different tracts, from different soils, and from different methods of cultivation varies very greatly. In good soil an average transplanted crop yields about 2400 lb of paddy per acre in a favourable season. Broadcast and drilled rice yields much less.

The grain, after it is thrashed, is known as rough rice or paddy and must be husked or milled before it can be used as food.

Storing.

Paddy is safer to store in go-downs for a long time than rice, but even rice can be stored free from weevils and other pests if carbon bisulphide is used, say 1 lb. for every 20 maund of rice stored in air-tight vessels, such as big earthenware jars tarred inside and out, and covered with earthenware dish sealed up with cowdung-paste after the jars have been filled with rice. The husking of paddy should be deferred for 7 or 8 months after harvest, but if steaming is done very little breakage takes place even in the case of new rice.

Husking.

The indigenous method of husking rice is as follows. The paddies are first half boiled, then dried in the sun, and finally husked by the ordinary pestle and mortar. Such rice is, in trade, termed "par-boiled." A pestle suspended from the end of a beam, worked by the foot, is made to fall with considerable force on the grain. A woman, standing at the further end of heavy beam, alternately rests and removes her weight from its extremity, thus causing the pestle to rise, then fall on the the rice, while a second person attends to the grain, sweeping it into a little mound under the strike of the pestle.

Husking of rice was originally performed in America by means of a mill, constructed of two large flat wooden cylinders, formed like mill-stones, with channels or furrows cut therein, diverging in an oblique direction from the centre to the circumference, made of a heavy and exceedingly hard timber, called lightwood, which is the knot of the pitch pine. This is turned with the hand, like the common hand-mill. After the rice is thus cleared of the husks, it is again winnowed.

Paddy has to undergo certain preliminary treatment before being subjected to milling. The first process, parboiling, consists in steeping the raw paddy for a period varying from 20 to 36 hours in deep brick-built and cemented tanks. The grain is next put in drums where it is subjected to live steam for about a quarter of an hour. Finally the swelled paddies are spread over cemented flooring and sun-dried for 24 hours being raked over until dried. All these operations presuppose considerable experience in handling as otherwise the result will be ruinous. Naturally these treatments are greatly hampered during the rainy season.

Rice Milling.

The process of rice-milling as carried on in a properly designed and constructed Burmese mill is thus briefly described.

The whole operation is conducted in different stages :—Preliminary cleaning of the grain from foreign matter ; Shelling ; Winnowing ; Separating ; Whitening and polishing ; Grading ; Bagging.

The paddy is first separated from the stones, and other foreign matter which it generally contains in more or less quantities according to locality. It is then elevated into shellers where the removal of the outer husk is effected. The machine essentially consists of two well balanced cast iron plates, the lower of which revolves while the upper is stationary; these plates are covered with a suitable composition of emery, the grain is fed through the eye of the upper disc and the husk is cracked off as it passes through the two rough faces. The removal of this outer husk is effected with comparative ease. From the shellers the grain is conveyed by an elevator to a separator where the coarse bran and broken rice are separated and taken off. The grain which is still mixed with husk is then elevated and passed through winnowers which generally comprise a double machine having one or more fans placed one above the other, giving a gentle and gradual separation, the aim being to obtain the highest possible percentage of the raw grain as finished product and to prevent good grain being blown away with the husk. The shelled and winnowed grain is known as 'cargo rice'.

The grain is then conveyed to the cone huller where the mealy cuticle is removed from around the kernel of the rice grain, and from which it emerges clean and white. In this machine the scouring is effected between an emery covered cone carried on a vertical spindle revolving inside a casing of stout wire cloth. The rice is fed into the annular space between the cone and the casing and by the time it reaches the bottom much of its covering has been scoured off and has passed through the meshes of the wire cloth in the form of meal.

IMPROVED SYSTEM.

In America elaborate methods and complicated machinery are used for milling rice. The rough rice is first scoured and fanned to remove particles of dirt, straw, and other foreign matter, and then passed between milling stones set just close enough together to break the hulls without crushing the grains. Fans blow out the light chaff, and a device known as the paddy machine separates out the grains that were not hulled the first time, so that they can be sent to other stones especially adjusted to hull the smaller grains.

At this stage the germ and outer skin still cling to the kernel. This is unpolished, or brown, rice and may be used as food without further milling. In order to give it a pearly lustre, the rice is put through a series of machines that scour, polish, and in some cases coat it with glucose and talc. Bran and rice polish are the by-products of milling processes, which although they rob rice of some of its most nutritious portions and much of its flavour, improve the keeping quality. Polished rice will keep almost indefinitely, while brown rice, because of the fat present in the germ and bran, is likely to become rancid, especially in warm weather.

The final preparation done in Europe merely improves the appearance of the grain and actually diminishes its nutritive value. Colouring matter and glazing materials such as French chalk, which though inert are not desirable additions, are added in the process.

After milling, the rice passes through automatic machines which separate it according to size and weight and sack it ready for shipment.

MILLING PRINCIPLES.

The process of rice milling requires specialized machinery for the shelling, grading and polishing of the grain, and owing to the wide variations in the character of the rice grown, not only in different parts of India, but even within relatively narrow limits in the same territory, considerable knowledge and experience are necessary for the selection of the most suitable design of machinery. A certain type of machine which may be successful in one district may not be suitable for another on account of the difference in the original grain. Again the market for which the rice is destined affects the machinery required for the milling, to some extent, and this should be considered when installing new machinery.

The essence of good rice milling is generally to obtain the maximum proportion of whole well celaned white rice from the paddy supplied to the mill, together with the automatic separation, grading and dressing of the broken rice and by-products obtained in the process. Of the whole milling process the whitening of the shelled grain is therefore the most important.

The first operation in the preparation of rice for the market is the removal of the husks from the paddy, leaving "cargo rice," which usually contains about 20 per cent of unhusked grains. In the subsequent operations the remaining husks are removed and the inner skin of the rice rubbed off with a certain amount of the outer part of the rice grain itself, yielding "white rice," and a by-product known as rice-meal or rice-bran. Finally, in the polishing of rice a further quantity of the outer layer of the rice-grain is removed, forming "polisher meal."

Provinces.

BENGAL.

The importance of Bengal for rice will be apparent when it is said that nearly one third of the total rice land of India is included in these parts. The varieties of rice recognised in Bengal alone are innumerable.

The most favourable climatic conditions for the rice crop are : (1) Premonitory showers in May, facilitating final preparation of land and sowing in seed beds ; (2) heavy showers at the end of June and July, facilitating transportation ; (3) fair weather for a fortnight in August, facilitating in garh and weeding operations ; (4) heavy rains in September, when the Aman is coming into ear ; (5) casual but heavy showers in October, about once a week, especially during the first fortnight ; and (6) one or two good showers at the end of January facilitating ploughing up of rice-land in cold weather. The *aus* crop does not need such a heavy rainfall, not late rainfall, as the *aman* does.

The most important rice-growing district in Bengal is Backergunj in Barisal. Nearly the whole quantity of paddy grown in this place is converted into rice by the indigenous system of husking, i.e., with *Dhenkis*, within 2 to 3 months of harvesting. Not even 1 per cent of its paddy arrives in Calcutta. Paddy in bulk comes to Calcutta from Khulna and Jessore. Both rice and paddy are borne by country boats on the intricate waterways of East Bengal. Dinajpur and Mymensingh are also important rice producing districts but the rice cultivation is affected by jute cultivation. The paddy grown on reclaimed lands on the Sunderbands, a deltaic tract, finds its way to Calcutta in large quantities.

The biggest rice market for the supply of Calcutta is Ramkristopur on the other side of the Hoogly. The largest stock of rice is held here. Next come Belliaghatta, Tollygunj, and Ultadinghi on the outskirts of the town. Stocks are held by *aratdars* in commodious go-downs.

The first rice mill of Bengal was established in Calcutta about a quarter of a century ago. The industry is now spreading into the interior. One or two rice mills may be now found in almost every district. Rice mills have also been started in Assam and Bihar. Naturally therefore there is a growing competition in this industry.

At present Calcutta is by far the most important rice milling centre in Bengal. The rice mills are situated at Chetla and Ultadinghi, the suburbs of the city. Burdwan takes the second place as regards the number of rice mills which are all located in Kalna. Next in order comes perhaps the borderland of the three districts of Howrah, Hoogly, and Midnapur. It is a significant fact that in every jute mill area on either bank of the Hooghly within a few miles up and down of Calcutta, there is to be found a rice mill catering to the needs of the huge mass of labourers.

About three-fourths of the paddy treated in the Calcutta mills are supplied by the district of 24-Parganas itself, the remainder being drawn from outside. The largest portion of the rice milled here is exported and a very small portion is intended for public consumption : a great part of the rice exported from Calcutta is also Dhenki-made and collected from the interior villages.

The famous *ballam* rice so congenial to the constitution of the Calcutta citizens is grown in Backergunj. But its use is waning. Indeed public taste is veering towards mill made rice. *Atap* rice of good quality is obtained from coarse paddy common in Khulna. The paddies generally grown in the 24-Pergs. are Patnai (coarse), Banktulsi, Bhashamanik (table rice), etc. Be it noted in passing that there are some varieties of paddy which cannot be milled into rice with machinery except by *Dhenki*.

Practically speaking, the milling operation is carried on in Bengal only for six months in the year, *Pous* to *Jaistha*, (mid December to mid June) which is the milling season proper. The next three months, Ashar to Bhadra (mid June to mid September) the operation is immensely hampered owing to the rains as the paddy cannot be dried and almost all the mills have to cease working. Again during the remaining quarter Aswin to Agrahayan (mid September to mid December) there is a dearth of paddy as the year's supply becomes exhausted and the mills then work intermittently. The season thus begins with the crop of the new harvest.

The two great factors which affect the rice industry are : (1) Production of paddy, (2) Export trade in rice. The first is in perfect harmony with the economic law of demand and supply and is dependent on control.

As to the second cause whenever there is unrestricted export trade the rice industry becomes brisk but as soon as export stops a large stock accumulates and consequently the market falls.

There is still another factor to be noticed. Sometimes the export of paddy preponderates over that of rice. It is largely exported to the other Indian ports. In that case the price of paddy soars high while that of rice comes down so that the margin of profit in milling grows less. Needless to say, that the profit in the rice industry depends on the difference between the buying price of rice and the selling price of rice.'

BURMA.

It may be proved with the help of statistics that whereas Burma is only fourth in the order of magnitude as regards rice acreage, and only second in the extent to which rice monopolises her cultivated acreage, she is first as regards the ratio of rice acreage to population. It is for this reason that her exportable surplus is so large and that she has assumed so dominant a position in the seaborne rice trade of India and of the world. But the exports of rice from Burma by land frontier are very small.

The rice crop in Burma may be divided into four clases. (a) Early rain paddy (kaukti) is a small crop harvested in September. Of late rain paddy (b) the short-lived (Kaukyin) paddy is the less important. The paddy harvested in November is practically all of this variety. (c) The mass of the crop is of the long-lived late-rain variety. (d) Dry weather paddy is grown only where the conditions in respect of water are exceptionally favourable. The bulk of the rice-crop, however, comes, commercially into sight in January.

BREAKAGE IN BURMA RICE.

The percentage of breakage in Burma rice are high and the fact is commonly given as a prime reason for the low prices obtained for it. The breakage is largely due to the high pressure of the short reason. The paddy is rushed forward by a very inefficient agency working against time and regardless of waste. All kinds of paddy though cultivated separately, are mixed by the middlemen. When they reach the mills, some effort is made to keep apart such large parcels as seem to be uniform in size, but this is rarely possible. There is no time to grade efficiently. Therefore big and little grains are milled together, and the big grains, which are the more valuable, get broken in the effort to mill the smaller grains. If the trade were less hurried this could to a very considerable extent be avoided. Breakage, which is specially marked in the later months, as a consequence of the grains having been heated, would be diminished if heating were prevented.

TRANSPORT AND STORAGE.

At present the methods of transport and storage in Burma are singularly primitive.

From the threshing floor to local point the paddy is commonly carted in bulk. The ordinary country cart is lined with matting and into it the grain is measured by tale of baskets. A very large proportion of the paddy that goes to the principal sea ports is carried by boat on the excellent water ways of Burma. In Rangoon it is considered that the rice so carried comprises that from the best tracts. Country craft propelled by oar and sail predominate enormously in this work.

The construction of rice godowns in Burma leaves much to be desired. In the villages they are commonly made of bamboos split, flattened and plaited, and have a roof thatched with leaves of one kind or another. Many are on ground level, but a considerable number are raised on piles to a height of three feet or so from the ground. The bamboo matting is daubed with a mixture of clay and cowdung designed to prevent the grain from escaping and to exclude rain and insects. The paddy is stored in bulk and is thrown in by the door ways, which are closed, from the base upwards with sectional planks dropped successively into vertical slots in the door posts as the heap of grain rises inside the godown.

MADRAS.

The chief paddy growing districts in Madras are Vizagapatam, Ganjam, Kistna, Tanjore, Malabar and Godavari. In Kistna, Tanjore and Godavari a large number of mills have been constructed in recent years for the milling and cleaning of the rice grain.

Both raw and boiled rice are produced in the Presidency although the latter is produced to a much larger extent than raw rice which is principally produced in some districts for immediate local consumption. In the Kistna and Godavari districts all the largest mills produce boiled rice which is exported to the Malabar Coast, Coimbatore, Colombo and Mauritius. The chief markets for the raw rice of these districts are the Bombay Presidency, the Nizam's Dominions, Bellary and Madras, whilst a small amount is sent to Bangalore. In the Tanjore district par-boiled rice is chiefly produced. It is chiefly exported to Colombo and the Malabar coast. The rice produced in other districts is chiefly utilized for local consumption.

The position and posibilities of the rice industry in Madras has been briefly summerized. The industry which is centred chiefly in the delta districts, Godavari, Kistna and Tanjore, has made great strides in recent years and is now one of the most important industries in the Presidency. Moreover, unlike the Burmese mills, which are chiefly controlled by the large European export firms, it is the product of Indian enterprise, and is entirely in Indian hands.

The existence of an export trade in Burma has made it essential for efficient mills to be constructed in order to reduce their cost of cleaned rice to a figure that would permit of competition with foreign mills, and in Madras this stimulant is lacking. It is unlikely that Madras will ever rank as a large rice exporting province unless agricultural improvements result in a considerably increased yield per acre. As matters stand, however, if well-designed mills were constructed in the various rice-growing districts under skilled supervision, the result of adopting improved methods of milling would be the production of superior finished products at a lower cost.

PUNJAB.

Gujranwala, Sheikhupura, Hoshiarpur, Amritsar, Muzaffargarh and Sialkot are the principal rice-growing districts in the Punjab where rice is a *kharif* crop.

There are two methods employed in the conversion of paddy into rice, one by boiling of paddy before husking and the other by husking or beating alene. The paddy is parboiled in the south west of the province only.

Paddy is first soaked in water and then is allowed to be gently heated till the formation of dense foam at the top. It is next placed in a large iron pan with sufficient water and the temperature is raised till it is observed that one or two of the grains have burst, this operation is locally known "roasting". The boiled paddy is then spread in the sun for drying, it is then husked. The husked rice obtained by this process is called "joshi rice". One maund of paddy yields 25 seers of rice. Husking with boiling is somewhat a tedious process, it is also done by hand labour in mortar. There are about 250 rice mills in this province to husk rice during the ginning season along with cotton. These mills generally mill paddy for merchants, It is estimated that during 1921-22, 412,816 tons of paddy were husked in the Punjab both by mills and hand labour. There are many kinds of the Punjab rice, Begami, Basmatti, Mushkan, Sotaida, Ratti or Sonpat, Chambwa and Hansraj. About 336,726 tons of rice were consumed during 1921-22,

Uses of Rice.

AS FOODSTUFF.

Cereals of one kind or other are the staple of diet the world over because they are available almost everywhere, are comparatively cheap, and are nutritious and palatable. Rice is the most important of all cereals used as human food. It forms the staple diet of most Eastern races and is also largely eaten in Europe and America.

In the tropical and sub-tropical regions, especially in densely populated countries where agriculture is the principal means of livelihood for the mass of the people, rice is the 'staff of life' ; and as a matter of fact, rice is the principal food of about one-half of the whole population of the earth. Amongst the more important of the rice-eating countries are the Chinese Empire, with a population of 400,000,000, British India, 300,000,000, Japan 50,000,000.

Rice is nutritious, easily digested, palatable and a relatively cheap source of fuel for the body as will appear from the following analyses :—

Composition of Rice.

	Per cent.
Water	12.44
Fat	0.35
Crude fibre	0.19
Protein	7.44
Ash	0.38
Nitrogen-free extract	79.20
Calories per pound	1630

But its nutritive value depends on the form in which it is eaten, polished rice being, as a rule, poorer in all constituents except carbo-hydrates, than unskinned and unpolished rice.

As, however, rice is essentially a carbo-hydrate food, it is necessary to supplement it with foods rich in proteins, such as meat or legumes, in order to obtain a well-balanced diet.

Throughout India a certain amount of rice is reduced to flour and eaten in the form of cakes. To prepare rice flour the grain is either steeped in water and then pounded in a mortar and the flour subsequently dried in the sun.

The substance sometimes known in trade as rice "flour" is the dust and wastage obtained as the power mills.

Rice and Wheat.

Rice is to the regions with wet summers what wheat is to the regions with dry summers. Rice shares with wheat the unusual distinction of being grown almost exclusively for human food.

Eastern people eat rice as regularly as western people eat bread. Rice is a palatable food when properly cooked, and it can be combined in many ways with more expensive and highly flavoured food into nutritious dishes.

Rice milled in the usual way contains about as much nourishment as highly milled wheat flour, the chief difference being that the wheat contains a little more protein and a trifle more fat and the rice more starch. Finally, it is easier to boil rice than to bake bread.

Industrial Uses.

Though rice is chiefly employed the world over as food, a considerable amount is used for industrial purposes, either merely ground for use as a size in the textile industry or converted into starch. Considerable quantities are also used in brewing, especially in Germany and Austria. Its other industrial uses include the manufacture of vinegar, and of laundry starch.

The Indian use of rice in brewing and distillation is both universal and extensive. A kind of bur made from rice is in almost general use throughout India.

As a source of alcoholic beverages, rice is used largely in Japan for the production of the drink known as *kaes.*

A special cement is made from the water in which rice has been boiled, mixed with a small quantity of pure lime.

Bye Products.

In the process of milling about one-third of the weight of the rough rice becomes by-products, of which a little over half represents hulls. The hulls are worthless as food but the bran is rich in fat, protein, and minerals, and when fresh and not adulterated with hulls makes excellent cattle feed.

As a general rule the rice bran or meal produced by the milling of the husked rice is mixed with the rice polish formed during the polishing process, the mixture being sold for feeding purposes as rice meal.

A certain amount of the rice dust produced in the hulling process is also sometimes mixed with the meal.

The chaff and waste obtained in winnowing and husking sometimes constitute articles of human and cattle food.

Straw.

Attention has been frequently directed to the subject of rice straw, and more especially the lower portion of the stems and roots (left generally to enrich the soil) as a paper material. But the straw is of too great value to the cultivators to be offered for sale and the roots are too troublesome to collect.

The most universal use of straw is as fodder for cattle and next to it is perhaps its use for thatching roofs. Straw is also plaited and twisted into ropes. In Nepal and elsewhere baskets are made of rice straw. In the rural parts of the country necklaces and other personal articles of adornment are some times made of rice stems and necklaces of unhusked rice.

Rice straw is used in China and Japan for making paper, matting, sandals, brooms, hats, and many other household and commercial articles.

RICE HUSKS.

Many attempts have been made to find a use for the enormous quantity of rice husks which accumulate during the milling process. In Burma a large proportion of the husks is simply thrown into the rivers, a practice which tends to silt up the rivers. Some of the husks are used as fuel in the rice-mills and attempts have been made to convert them into briquettes in conjuction with petroleum by-products. They are also employed as packing material and it has been suggested that they might be utilised in the manufacture of linoleum. Rice husks have been used as a filler in compound feeding stuffs for live-stocks.

Some writers allude to the fact of a dye being obtained from rice husk. This substance contains a small amount of a pale yellowish-brown colouring matter, and when boiled in water the infusion may by the use of various processes, be made to dye light shades.

Reports.

RICE MILL ENGINEERS.

Messrs Marshall Sons & Co. (India), Limited, Engineers, 99, Clive Street, Calcutta are the sole agents in India and Burma for the well-known Engelberg rice milling machinery which has stood the test of time. In remarkable testimony of its efficiency nearly all the rice mills in this country are equipped with this machinery which is very simple, accurate, strong and up-to-date. The firm will be always pleased to give the readers of INDUSTRY interested in this business the benefit of their wide experience by advising the type of plant which should be installed considering all the circumstances. As a result of certain enquiries we referred to them we have been able to ascertain the following facts :

(1) The chief claims made on behalf of this particular make of machinery is that it is very simple and easy to handle, and that the output is large, with the result that it is very popular amongst the rice mill owners throughout India. Although this machinery is slightly dearer than the average machines on the market to-day, it is claimed that the wearing parts last longer.

(2) The general outline of a complete Rice-Mill is simple. The Plant consists of a suitable size Engine and Boiler ; and the power from this Engine is transmitted to a main shaft which in turn drives the Hullers and Fanner. The size of the Plant depend upon the quantity of finished rice which is to be produced per day. All Mills do not of course have the same output ; some have only one Huller in the Mill, whilst

others have as many as 8 or 12, with a corresponding increase in output.

(3) What is known as a one-Huller Plant would cost approximately Rs.8900 and an eight Huller Plant approximately Rs. 54000.

(4) Engelberg Rice Milling Machinery combined with Marshall Steam Plant is in use throughout India with the greatest success.

(5) It would appear that the question of the drying of paddy has received the most careful attention of the Rice mill Engineers. The chief difficulty experienced is in getting machines to dry paddy in sufficiently large quantities to keep the Hullers working continuously. These Drying Machines are also very expensive in comparison with the Hullers. It can also be safely held that rice produced from machine dried paddy is generally considered to be inferior to that from sundried paddy.

They have submitted the following report :—

Perhaps without exception the rice mills of Bengal make *ushna* (or parboiled rice) which is best effected with the help of steam plant. In cases, therefore, where millowners use any power other than steam engine to run the machinery they are obliged to maintain a boiler for steaming paddy. This double system apparently curtails a good bit of their profit. The only reason why millowners try to avoid or dispense with steam power is to be sought for in the coal crisis but the recent introduction of husk-burning furnace has given much facility to the rice business in this respect. The problem has been satisfactorily solved and an enormous saving in coal expenditure has been effected.

The rice mills running in Bengal may classified into two broad divisions, viz., (1) Automatic and (2) Non-automatic, the ratio of the former to the latter being one to hundred. The reasons why automatic mills are so scarce are partly because such plants are suitable only where an output of at least five hundred maunds of rice is expected in 10 hrs. but most of the mills are below this level ; and partly because people are less adventurous in experimenting with such complicate machinery and are conservative in respect of new introductions. But although the automatic plants are complicated and involves much initial expenditure they have at least one advantage in their favour that they save labour to a great extent.

The automatic mills comprise paddy cleaner, grader and separator, sheller, huller, fanner and polisher each served automatically with paddy by elevators and conveying arrangements. The non-automatic mills, unlike the above, are much simple. In most cases, they consist of hullers and fanners only. Engine and boiler, vat and steaming tanks are common items in both the systems. The whole operation of rice milling in non-automatic mills is also very simple from beginning to end. Paddy is steeped in vats for about 24 hours, then removed to the steaming tanks, where it is steamed for 3 to 4 minutes. The paddy is next strewn over the cement flooring for drying in the sun. When properly dried they are put into the huller or sheller for the first operation. The semi-hulled paddy is then put into the second huller which produces the finished rice. Finally to polish the rice and to clean it from particles of husk and grain (*kura* and *khood*) it is blown with the rice fanner.

In all cases before any industrial enterprise is launched upon the prospective industrialist should have the most up-to-date information available for the time being from the experts if he is to bring his concern to a success. It is therefore strongly impressed upon the mind of the prospective rice miller that he should first consult the best authority in this line before he risks anything in the project or before he makes any final selections.

SELF-CONTAINED RICE MILLS.
(GERMAN.)

It is now a well-known and generally recognised fact that the best and economical way of rice-milling is by means of sheller, paddy-separator and rice cone, as by this process the product is received as perfect and white in appearance and contains only a small percentage of broken grains—while in other types of hullers the rice milled is not so white and polished and also there is greater percentage of broken rice. This type of mills is unique inasmuch as it mills sun-dried *atap* rice in a highly efficient way, while in other types, there is a large percentage of broken grains. The concise outline of the principal rice milling machines of this type is as follows :—

The parboiled or ordinary paddy is first of all subjected to a clearing process by means of large reciprocating sieves, or reels, or paddy riddles and the draft of aspirating fans. There is also a Magnetic separator to remove any iron pieces. Then the cleaned paddy goes to the Disc shellers which crack the husk and release the kernel by which about 95 per cent of grains are hulled up in one passage practically without breakage. Then the husk and particles thereof are removed by passing the rice over Blowers or aspirating fans. Then the Paddy separator separates the hulled grains from the unhusked ones in the most precise manner. The paddy returns from the separator and are again passed over the sheller while the husked grains go to the White rice cone which serves the purpose of removing the outer cuticle (coating) of the brown rice by means of abrasion in order to make the rice fit for food and give it a clean, polished and white appearance. If more polished rice is required then a Pearling cone is used. The whitened and polished rice is now led to the Planisifters which are to separate the broken rice produced in the hulling and pearling process.

If it is required to give the rice not only a perfect finish and white appearance, but also a transparent, glassy appearance then glazing drums are to be used.

Some special advantages are claimed for the above machines. They can be so arranged as to make up a self-contained rice mill by putting elevators, pipes etc., so that by admitting the paddy on one end finished rice may be taken from the other end, the whole process being completed automatically. Consequently the cost of labour will be much smaller in this case. Another advantage of these mills is that they require about 40 per cent lesser power to drive them than in ordinary types of rice mills. Consequently the running cost is much smaller in this case. Both kinds of rice namely parboiled and sun-dried are milled in an excellent and efficient way. There is much less percentage of broken rice, and broken rice is separated from the whole ones, that is to say, rice is graded.

Last, though not least, the high percentage of bye and waste products in a rice mill explains the importance. The greatest portion of waste products is husk, which equals, with some kinds of rice, fully 25 per cent. of the paddy. The husk is an excellent fuel for the boiler and is used wherever a steam engine drives the mills. For this purpose a portable husk-burning furnace may be installed. This has the advantage that when the husk falls short, coal as a fuel, can be used by removing the furnace.

Complete estimates for all capacities are supplied on request by The Oriental Machinery Supplying Agency Ltd., 20-1 Lalbazar Street, Calcutta.

Suggestions.

The authorities of the Rice Mill of The Kanan Devan Hills Produce Co. Ltd., Trichinopoly make the following suggestions on the scope for improvement in rice milling so as to prevent waste and economise cost, etc. :—

(1) The substitution of shellers and separators for hullers which give a large outturn and a small percentage of bran.

(2) Well laid barbecues.

(3) The methodical turnover of paddy on barbecues to obtain even dryage.

(4) The adoption of wooden rakes for this purpose.

They also offer the following remarks in regard to hindrances in expansion and future prospects :

In dry cultivation the best results from the land are not obtained, the top soil only being cultivated to a depth of approximately 2 inches. The ploughs used have been in existence from time immemorial and it would pay the ryots to hire tractors to cultivate their land at least once in five years. In these circumstances the effects of aerating the soil would be quickly experienced and doubtless would be repeated as circumstance afforded.

Rice Trade.

The rice trade of the world falls naturally into two great branches : the Far Eastern branch, requiring a cheap rice for feeding the native population ; and the Western branch, requiring large quantities of medium quality rice and much smaller quantities of high quality rice. The Far Eastern Branch is catered for to a very large extent by Siam "field" and Indo-China rices, both poor, cheap qualities, and to a less extent by Rangoon rice. The Western branch is supplied mainly by Rangoon and Siam "garden" rices, both medium qualities, and for the special qualities by imports from Bengal (Patna rice), Java, Japan, United States, Italy and elsewhere. For this trade also highly milled and polished rices are produced in European mills, mainly from rice imported originally from Burma and Siam.'

' The chief countries of the world which produce enough rice to export on a large scale are India (chiefly Burma), Siam and Indo-China. Siam and Indo-China, therefore, are the only serious competitors with India in the export of rice. Japan, Italy, Spain, the United States and Java all export special kinds of rice in comparatively small quantities.

The three countries of South Eastern Asia, viz., Burma, Siam, and Cochin-China, are to the rice-shipping world what Western Canada and Argentina are to the wheat-shipping world—regions of large area and small population, having therefore, a surplus for export, but playing a comparatively small part in the world's production. China and India proper are among rice-growing nations what Europe is among wheat-growing nations, the greatest producers, with almost no surplus.

Liverpool is the chief centre of the rice-milling trade in the United Kingdom. In Germany most of the mills are in or near Hamburg and Bremen, and are situated on the water side. The Dutch rice mills are situated in Amsterdam, Rotterdam and Zaandam.

India's export trade in rice is less susceptible to seasonal influences than in the case of the majority of food grains because in Burma which contributes the greater part of it, a failure of the rains is unknown. The volume of export to foreign countries is however affected by crop shortage in other parts of India. Any failure of the monsoon in India at once creates a remarkable inflation of values in Burma to which the range of prices in foreign markets does not usually respond. Burma practically has a monopoly of the export trade in rice and also makes good any shortage in the supply for local consumption in other parts of India, because the ratio of acreage under rice to population is so high that her exportable surplus is far larger than that of Bengal, Bihar or Madras who grow more rice but have to meet a much higher internal demand. The Burma trade represents between 70 and 75 per cent of the whole. The Madras trade is practically confined to Ceylon and Mauritius.

An important feature of the Indian rice trade is the rise and present position of the Burma power-mills. These mills had their origin in the very high cost of labour in that province and the disinclination of the Burman agriculturist to undertake any work he can avoid. In Bengal the rice crop is as a rule husked by the growers; in Burma it is conveyed to the market as paddy. It thus soon became evident that if rice was to become an important article of export, it must be husked at Rangoon. This gave rise to the important rice-milling industry of Burma. At present Rangoon is the greatest rice port in the world.

NOMENCLATURE.

Rice in the husk before hulling is known as *paddy*. After hulling it becomes *rough rice* and after pearling it becomes *cleaned or white rice*. The broken grains of rice are separated out and sold as *coodie* or *khood*, while the higher grades of rice are subject to a further process of polishing on sheep-skins with the object of removing any rice meal which may adhere to the grain. No chemicals whatever are used in this polishing process or in any other process connected with the milling of rice. *Cargo* rice contains 5 to 20 per cent. of unhusked rice i.e., paddy, and, if exported in this form to Europe, is subject to further milling on arrival there. The ratio of paddy to rice by weight depends entirely on the quality of rice produced. In the case of *specials* it may be taken as of 8.5, but the ratio for better quantities is lower. For *boiled rice* there is no market in Europe, but there is a considerable demand for the grain in this form in India and also in countries where Indian labour is employed such as the Federated Malay States and Ceylon.

Statistics.

PRODUCTION.

ESTIMATE OF RICE CROP FOR 1923-24.

The total area reported is 78,227,000 acres, as compared with 82,401,000 acres of last year, or a decrease of 5 per cent. The total yield is estimated at 28,298,000 tons of cleaned rice, as against 33,716,000 tons, of 1922-23, or a decrease of 16 per cent.

Provinces and States.	Area 1923 24 (1000) acres	Yield 1923-24 (1000) tons	Yield per acre 1923-24 (lbs.)
Bengal	20327	7515	828
Bihar & Orissa	13997	4899	784
Madras	10634	4720	994
Burma	11453	4167	815
United Provinces	7039	1971	627
Central Provinces & Berar	5815	1796	692
Assam	3472	1486	761
Bombay	3196	1358	952
Coorg	83	40	1080
Hyderabad	502	160	714
Mysore	638	160	562
Baroda	171	26	341
	78227	28298	810

The average yield per acre works out to 810 lbs. as against 917 lbs. in 1922-23.

In addition to the areas for which particulars are given above, rice is also grown in other tracts in British India, and the average area so grown for the five years ending 1921-22 was estimated at 9[illegible]5,000 acres with a yield of 335,000 tons.

INLAND TRADE.

The quantity of rice not in the husk despatched from the ports decreased from 1114000 tons in 1919-20 to 742000 tons in 1920-21. The exports from Calcutta were directed chiefly to Bengal, Bihar and Orissa, the United Provinces, the Punjab, the Bombay Port, the Central Provinces and Berar, the Nizam's Territory, Central India, Karachi, and the Madras Presidency; from Bombay port to the rest of the Bombay Presidency, the Central Provinces and Berar, the Madras Presidency, Central India, and the Nizam's Territory; and from the Madras ports to the rest of the Madras Presidency, Mysore, the Nizam's Territory, and Bombay Port.

EXPORT TRADE.

Review of the Trade of India in 1922-23.

The following statement compares the total outturn of rice in India and Burma with the total exports during the last four years and the pre-war year :—

Total outturn of rice in India and Burma and total exports by sea to foreign countries.

	Production cleaned rice Tons (1000)	Exports Rice Tons (1000)	Exports Paddy Tons (1000)
1913-14	28819	2420	30
1919-20	32028	618	34
1920-21	27662	1060	35
1921-22	33160	1366	39
1922-23	33468	2088	37

The production of cleaned rice in 1922-23 was estimated at 33 million tons, practically the same as in the preceding year. Exports increased by 722,000 tons to over 2 million tons, to which Burma contributed 84 per cent, Bengal 10 per cent, Madras and Sind 2 per cent each and Bombay 1 per cent.

Statistics of Exports for 1921-22.

A. Rice in the husk (or Paddy)

	Quantity Tons	Value Rs.
Ceylon	36630	3321302
Total British Empire	39014	3553382
Total Foreign Countries	4	673
Grand Total	39018	3554055
Share of Bengal		
,, Bombay	2	410
,, Sind		
,, Madras		
,, Burma	39018	3554055

B. Rice not in the Husk.

United Kingdom	108116	19720409
Mesopotamia	31581	6055337
Bahrein Islands	27155	6355145
Ceylon	305082	58402796
Straits Settlements	134709	22184311
Hongkong	30648	4173972
Egypt	34302	5519845
Mauritius	54355	11909877
Australia	1446	2268194
Total Britisth Empire	786130	145871139
Germany	231270	39789308
Netherlands	28307	4238287
Italy	11299	1728451
Maskat Territory	24506	5654542
Arabia	21977	4823970
Sumatra	32154	4757330
Java	133373	20377513
China	17600	2636017
Japan	42408	7020034
Cuba	15334	3501892
Total Foreign Countries	580326	99749668
Share of Bengal	11711	3257566
,, Bombay	2377	586179
,, Sind	84934	19533761
,, Madras	52937	10576065
,, Burma	1214497	211667236
Total	1366456	245620807

The coastwise exports from Burma to Indian ports in the last five calendar years were :—

Year.	Tons.
1919	1920800
1920	952400
1921	1212800
1922	706200
1923	579400

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3. The Commercial Products of India, By Sir George Watt.

4. Imperial Gazetteer of India.

5 Hand-book of Indian Agriculture, By N. G. Mukherjee.

6. Food-Grains of India, By A. H. Church.

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2. Burma Rice, By Frederick Noel-Paton.

3. Rice as Food, (Dept. of Agriculture, U.S.A.)

IMPLEMENTS.

Rice Cultivation.

International Harvester Company of America, 606 So. Michigan Ave. Chicago, Ill.

(Representatives)

Macbeth Bros & Co. Ltd., 1, 2, Hare Street, Calcutta.

Rice Cleaning Machine.

S. Howes Co., Inc. Eureka Works, Silver Creek, New York.

Paddy Separators.

Huntley Manufacturing Co., Silver Creek, New York.

Rice Hullers.

The Engelberg Huller Co., Syracuse, New York.

(Representative)

Marshall Sons & Co. Ltd., 99, Clive Street, Calcutta.

Rice Mill Machinery.

Douglas & Grant Ltd., Kirkcaldy, Scotland. Local Office, Merchant St., P. B. 459, Rangoon.

Mc. Kinnon & Co., Aberdeen, Scotland.

Hind and Lund, Preston, England.

Rice Mill Plant.

F. H. Schule, G. m.b. H. Hamburg, Germany.

Rice Bags, Pockets Etc.

Mente & Co., Inc. New Orleans, U.S.A.

Periodical.

The Rice Journal, New Orleans, La.

General Machineries.

Koerber and Naumann-Maschinenfabrik U Muhlenbauanstalt. Hamburg-Billbrook. Self-contained Rice Mills. Universal Rice Mill, Small Rice Milling Plant. Hullers, husk separators, paddy separators, polishing and pearling cones, glazing drums.

Rice Mills.

Number of Rice Mills in India, District by District.

I BENGAL.

District	Mills.
Calcutta	1
24-Parganas	134
Nadia	2
Hoogly	13
Midnapore	9
Howrah	3
Burdwan	24
Birbhum	7
Bankura	1
Bogra	2
Murshidabad	1
Dinajpur	2
Malda	1
Backarganj	1
Total	202
Labourers	7867

II ASSAM.

District	Mills.
Lakhimpur	1
Labourers	26

III BIHAR AND ORISSA.

District	Mills.
Muzaffarpur	1
Champaran	2
Bhagalpore	3
Darbhanga	2
Cuttack	1
Balasore	1
Purnea	2
Patna	1
Total	13
Labourers	864

IV BURMA.

District	Mills.
Akyab	10
Rangoon	56
Myaungmya	31
Hanthawaddy	31
Tharrawaddy	39
Bassein	21
Insein	10
Yamethin	4
Amherst	28
Tavoy	8
Mandalay	19
Minben	9
Mergui	4
Prome	18
Toungoo	7
Maubin	10
Pyapon	22
Pegu	35
Kyankse	3
Lower Chindwin	2
Sagaing	1
Shwebo	23
Katha	2
Henzada	11
Thaton	17
Thayetmyo	1
Total	422
Labourers	40865

V BOMBAY.

District	Mills.
Sind	55
Sukkur	20
Hyderabad	3
Thar & Parar	4
Thana	4
Kolaba	1
Total	87
Labourers	1787

VI MADRAS.

District	Mills.
Madras	1
Nellore	4
Vizagapatam	4
Godavari	27
Ganjam	4
Tanjore	35
Anatapur	3
Salem	2
Chinglepet	1
South Arcot	1
Tinevelly	1
Kistna	58
Guntur	27
North Arcot	1
Malabar	1
Trichinopoly	1
Total	172
Labourers	8582

VII PUNJAB.

District	Mills.
Amritsar	2
Gujranwala	2
Total	4
Labourers	175

VIII INDIAN STATES.

(A) Madras State Mills

Travancore	1
Labourers	27

(B) Hyderabad

Warangel	13
Nizamabad	1
Mahbubnagar	1
Labourers	632

(C) Baroda

Baroda	1
Labourers	30

(D) Mysore

Mysore City	2
Labourers	111

Grand Total	921
Labourers	61,019

Canning—How It is Done—I.

Factory Site.

FACTORY must be located near the district of production. A cannery which depends upon long distance shipment or purchasing the supplies from a city market can never acquire the required efficiency. The facilities for bringing in or sending out the stock should be ample, so that materials used need not be delayed especially when it may mean deterioration. The location must be sanitary, away from manufacturing processes, such as soap making, tannery rendering fats or any other processes which may give rise to noxious odours, or may be productive of organisms of decomposition. The site of the plant, if at all possible, should be on high ground having good drainage. Stagnant water, under or around the building, especially if contaminated with refuse and waste, which is always a possibility about any canning factory, may form a breeding place for various microbes which will do incalculable injury to the pack.. The supply of water should be sufficient for all purposes and of good quality; that used in washing, blanching, and brining should be free from excessive hardness or iron, otherwise the finished products may be damaged. The water used for washing about the factory should have a good pressure for cleaning.

The ceiling of all rooms should be high, with ample provision for light and ventilation. The light should come from numerous side windows so as to give a flood of light, and at the same time provide good ventilation. Light has a beneficial effect upon employees, contributes to cleanliness, and is an active, constant, disinfectant. An abundance of light and air is a combination which will contribute to the maximum of labour efficiency.

A tight hard floor is necessary. Concrete, although not an ideal floor, is the best for certain conditions, it wears rough, is more or less porous ; most of the modern factories find concrete floor to be the best. If there be plenty of floor space, the first or the main floor should be chosen for food preparation, because the work can be supervised to better advantage on one floor than on many ; belt conveyers, rollers tables, gravitvshoots, should be used in handling the product as far as possible, in preference to trucks as the latter are destructive of floors and are not so clean.

That part of the factory in which prepared material is in any way exposed should be screened to keep out flies and dust. This precaution is often of greater importance than the protection of the workroom, as during the working period the moving of the machinery and escaping steam will drive away insects.

The tables used in the preparation of foods should be plain and of a material that is easily cleaned; hardwood such as maple, or ash is probably the best material used in majority of the factories. The amount and kind of equipment varies greatly upon the product.

For factories running continuously and employing the same help uniforms are advantageous.

METHODS OF PROCESSES.

The steps in canning will vary with the product, but there are certain processes which are common to all, and may be described in an outline, as handling of raw materials, grading, washing, peeling, filling, syruping, blanching, exhausting, capping, processing, cooling, testing, labeling and packing.

HANDLING OF RAW MATERIALS.

The condition of the material on delivery is of great importance, therefore, it is essential that the product be delivered in the first class condition, fresh from fields or orchard, and in a manner to prevent injury. All kinds of berries should be handled in small boxes, mangoes, pears, peaches and apples, in shallow crates and peas, beans and green "Channa" in such quantities that they will not heat.

GRADING AND PEELING.

Grading or sorting is of great importance. The product is graded according to its quality ; the sorting is usually done on moving belts or special table tops to expedite the work. The green, defective and wrinkled product is picked out, at the same time special attention is given to the foreign substance which is taken off. After grading the product undergoes the process of necessary peeling. In case of some products peeling is done by automatic machinery, while in others it is accomplished by hand labour. Fruits like berries and currant are steamed.

WASHING.

The next operation is generally that of washing, the method depending upon the material canned. In general, most products are placed in tank of water to loosen adherent dust or dirt and gently rolled over by the agitation of the water, and then sprayed as they emerge. A small spray with force will cut off the dirt and adherent mould very successfully. There are simple implements on the market, which bring out much better and quicker results than can be obtained by hand labour. Whatever method is used, the cleaning should be thorough.

PREPARING AND BLANCHING.

The operation of blanching is of much importance in putting up good vegetables. It is not a matter of whitening as the name might seem to indicate. Many of the fruits need no special treatment other than cleaning and sorting, after which they are placed directly in the cans. This process of blanching is in reality parboiling. Vegetables are dropped in boiling water from one to five minutes as a rule, to cause softening, and at the same time to remove some of the mucous substances which form upon the surface. The effect of softening produced by short boiling in the open as compared with boiling in the closed can is surprising.

FILLING THE CANS.

The cans should be washed just prior to being used. All the fruits are filled by weight ; the reverse is true of vegetables ; corn, peas ; baked beans, homeny, pumpkin, squash, and most tomatoes, are filled by volume. The filling may be done by hand or machine. There are many products, especially fruits, which cannot be successfully filled by machine for fear of crushing and injuring them. Milk and soups are machine filled. A large part of salmon pack is machine filled, but sardines and tuna are layered by hand. When filling the cans head space equivalent to at least ¦ to ½ inch should be left for without some space the production of small amount of gas will destroy the vacuum.

Syruping and Brining.

Nearly all the products have a syrup or brine added. All high grade fruits require good syrup, the degree of which becoming as much a part of the grade as quality of the fruit. The vegetables require a salt or sweet brine, the latter being made with the mixture of salt and sugar. Some products like, squash, pumpkin, and tomatoes, etc. do not need the addition of any liquid.

Exhausting.

After the cans are filled, they are heated gradually to partially drive out the air ; this process is not necessary for products that are subjected to fore-cooking or for those that are kettle cooked, and filled hot, and is not generally employed with such products as peas and beans which receive a hot brine. The time required for exhausting depends upon the degree of the heat required in the product. For products as corn, pumkin, squash, and sweet potatoes, a temperature of 180 degrees Fah or higher is desirable; for fruits and tomatoes a temperature of 135 degrees Fah will suffice. For products which will stand the higher temperature the heating should be continued for 5 to 8 minutes. With fruits the heating should be less vigorous and the time rather extended, as too high a temperature cause fruits to swell and float on the top of the syrup as well as soften and break open, and it is better to take four or five minutes, rather than two minutes in reaching 135 Deg. Fah. On an average 5 to 6 minute will give better result. Meat and fish are held 8 to 20 minutes in vigorous exhaust. Milk is the one of the few products which is packed cold.

Capping.

The method of capping depends upon the type of the cans used, the solder top cans are sealed by automatic machines, which wipe tops, place the caps, apply the flux, heat the solder and close the vent, without the introduction of hand labour. The sanitary can is closed by automatic machine and also by hand operated machines, no solder or acid is used in order to seal the sanitary cans. Where the machines are not available the hand soldering copper or capping steel is used.

Processing.

After packing, the cans are processed according to the nature of the contents. The final act of sterilizing the cans is known as the process, and it may be carried on below, at or above the boiling temperature. Fruits are done below or at the boiling temperature ; open water baths are generally employed, and the temperature is controlled by some adequate device. Most vegetables are processed above the boiling point, so the work is accomplished in retorts in water or steam under pressure. Milk, fish and meats require temperature from 235°F. to 250°F. The time of process depends upon two factors—the resistance of the organism to heat, and the nature of the material. It should be borne in mind that if the product is over processed, or over cooked the quality is apt to be inferior, the colour will be changed, some time the product will turn black. The best way is to process the product in small batches at different temperatures, and for different periods; by such experimenting you can get desired temperature and the exact time for which the product should be kept in water of retort.

COOLING.

Most of the fruits are processed from 12 to 25 minutes, tomato is processed for 50 minutes, other vegetables, as peas, beans, corn, both green and dry are processed from 75 to 80 minutes.

As soon as the processing is completed the can should be cooled. Unless this is done, the heat will be held in the cans, and the contents become over cooked, the cooling is generally done by spraying water on the cans, or dipping the cans in tanks of cold running water.

TESTING AND LABELING.

The product should be tested just prior to being labeled, and packed. Out of every batch which is processed and cooled, one can is cut open and is examined for the quality of the contents, and thus the product is standardized. After testing the product is sent to the labeling room: the operation of labeling is done both by machine and by hand Hand labour is preferred to machine where labour facilities are more and cheap. The most important factor, in labeling, and the one which is overlooked by most manufacturers, is the design of "Label". The label should tell the truth in terms which are direct and easily understood. It should give the name of the article, the grade, by whom packed, and where packed, if necessary, the name of the distributor.

PACKING.

The final process is packing. This process especially is neglected in India, not only in canning but in other industries as well. The cans can be packed and shipped to the best advantage in cardboard boxes, fibre cases, or the wooden boxes. Every case before shipping should bear the name of the firm.

—By Mr. Shadi Ram Sharma, Purdue University, Laffayatte, Indiana, U.S.A.

Rice Preparations.

DHAN is rice in the husk, or paddy. *Chawl* is rice husked by pounding in a wooden mortar. *Bhat* is boiled rice (in water). Rice is sometimes boiled in milk usually with sugar when it produces *paramanna.*

Rice is eaten in many forms and prepared in many ways besides those alluded to above.

(1) *Chura or Chira.* Some *dhan* is boiled, dried and pounded to separate the husks; the *chawl* thus obtained is then heated in a wire-mouthed earthen-pot, and while still hot is flattened by beating. This preparation may be eaten alone, but it is often made into balls with gur or molasses, or taken with curdled milk (doyi), with milk and tamarinds, or with sweetmeats.

(2) *Alochira* is made by steeping the rough *dhan* for a night in cold water; it is then parched and afterwards flattened by beating.

(3) *Khoyi* is made by parching rice which has been exposed to the dew. It is eaten with molasses, constituting *murki*, or with milk.

(4) *Muri* is prepared by first heating *chawl* with salt for about half an hour in a shallow earthen vessel kept agitated, and finally parching it. It is eaten as tiffin generally by itself but sometimes with oil.

(5) *Chaol-ka-atta* is rice meal made by slow grinding in heavy hand mills. It is kneaded with water into balls or cakes, which are boiled like a pudding, or used as bread.

Ideas for Small Capitalists.

Silvering Glass.

Prof M. L. Verma, Ph.B.Sc., M.E.-H.G., A.M.I.A.Sc,, Galgala, Jubbalpur C. P., sends us the following :—

It requires no introduction to point out that mirror-making is a profitable industry which can be easily started with a small capital. Any one can prepare good looking glasses by the process detailed here.

The following different solutions will be required.

(A) Reducing solution—

Loaf sugar or sugar candy	90 gr.
Strong pure nitric acid (sp. gr. 1·22)	4 c. c.
Alcohol (absolute)	175 c. c.
Distilled Water	1000 c. c.

The sugar is dissolved in the water and then the alcohol and nitric acid are added. The solution will require to be held over for at leat a week before it is used, and must be kept in a stoppered bottle.

(B) Silver solution—

Silver nitrate	1 gr.
Distilled water	100 c. c.

(C) Ammonia solution—

Ammonia (sp. gr. .880)	1 c. c.
Distilled water	10 c. c.

(D) Potash solution—

Caustic potash (prepard by alcohol)	0 5 gr.
Distilled water	50 c. c.

Solution B and C will keep for some months if contained in well-stoppered bottles and kept in the dark. Solution D will keep for a few weeks.

The above quantities will suffice for silvering a mirror having an area of about 50 sq. c.m if used in a dish such that most of the silver is deposited on the mirror and not on the sides of the dish. For smaller or larger mirrors, ingredients in proportional quantities can be taken.

To prepare the solution for silvering take about 4/5 of the silver solution B and place it in a beaker which has been washed out with strong nitric acid and then with distilled water, and add the ammonia solution C drop by drop stirring all the while. Till the precipitate is partly dissolved, the solution being a light brown colour. Then very carefully add drop after drop of the ammonia, stirring for nearly a minute between each drop, till the solution attains a light straw colour. If by accident too much ammonia is added, so that after stirring for some time the solution becomes colourless add a drop or two of the silver nitrate solution. It is essential for success that no excess of ammonia be present.

Next add the potash solution D and then having diluted the remainder of ammonia to about twice the bulk, add this solution drop by drop, till the precipitate formed when the potash was added is nearly all dissolved. A few particles of precipitate may not dissolve ; these should be neglected, and the adding of the ammonia stopped when the bulk of the liquid becomes colourless. Now add some of the reserve silver nitrate solution even after stirring 2 or 3 minutes, does not become clear, but remains of a light-brown or yellow colour. The solution may then be filtered and is ready for use.

The glass having been cleaned, takes the solution prepared as described above and add 6 c. c. or the reducing solution. A for each gram of silver nitrate taken, and having well mixed the solution pour over the surface to be silvered. The solution will first turn aimost black and then the silver will start depositing. Particulars of cleaning, polishing, finished surface and protecting the silver surface will be supplied in future.

Small Trades & Recipes.

Rice Cement.

An excellent cement may be made from rice flour. Mix a quantity of rice flour intimately with cold water and gently simmer it over a fire. The mass will readily form a delicate and durable cement. It will not only serve the purpose of common paste but is also admirably adapted for joining together paper, cards, etc. This cement is largely used in China and Japan for this purpose.

Again when the paste is made of the consistence of plaster-clay, models, busts, bas-relievos, etc. may be formed of it ; and the articles, when dry, are susceptible of high polish, and are very durable.

Rice Powder (Pondre de Riz)

Starch flour	4 lb.
Bismuth sub-nitrate	6 oz.
Lemon oil	1 dr.
Otto of rose	30 mm.

Mix the basic ingredients and incorporate the perfumes.

Rice-Starch.

Starch is more abundant in rice grain than in wheat. For purposes of ordinary starching, the peoples in the East Indies used the water in which rice has been sometime boiled, called *conjee* or *gunji* in India, and in Chinese *Mi-tang*. A starch from rice is prepared in China, called Mi-tsiang-fen. It is the Mi-t'ang mixed up with powdered gypsum, the product cut up in thin rectangular cakes and dried in the sun. For starch-making, great shipments of rice are now made from Calcutta, Akyab, Rangoon, Moulmein and Cocanada. There are several patent processes in existence for the manufacture of rice starch, which are accomplished chiefly by digesting rice in solutions, more or less strong, of caustic alkali, (soda), by which the gluten is dissolved and removed, leaving an insoluble matter composed of starch and a white substsnce technically called fibre.

Rice Glass.

What is known as rice glass is nothing but the alabaster or opal glass which is a glass resembling bone glass, but opaque and of a superior lustre. It is merely a preliminary stage in the formation of glass, very rich in silica and imperfectly fused. The same mixture is used in its preparation as for crystal glass.

Rice Paper.

The rice paper is brought from China in plain and dyed sheets and not unfrequently with various coloured designs on them. The source of this product has been ascertained to be *Aralia papyrifera*, which grows abundantly in its wild state in numerous parts of Formosa.

Rice Wine.

Rice wine, rice beer, and rice spirits are vinous and spirituous fluids manufactured from rice. In the Himalaya, both a beer and a wine are made. In Kulu, Lahore, and in the Sutlej Valley, a kind of beer, and in Nepal a spirit (Jand) is distilled from the grain, also a beverage called '*phaur*' very much resembling ale, and procured in the same manner. In Southern India, in the preparation of arrack spirit, rice forms an ingredient. The *Lau* spririt of the Burmans and Siamese is prepared from rice.

In Java, two spirits are prepared from it. One of these, called "badek," is made by first boiling and stewing the rice with a ferment called *razi*, consisting of onions, black pepper and capsicum, and mixing and forming the whole into small cakes which are daily sold in the markets. After frequent stirring, the mixture is rolled into balls, which are piled upon each other over a high earthen vessel, and when fermentation has commenced, the badek exudes and is collected at the bottom. The remainder, after fermentation is completed, is sold as a dainty in the markets under the name of *Tafe*.

The other rice spirit is called *Brom* and is made from Ketan or glutinous rice and is of a brown, yellow or red colour according to the colour of the rice used. This is boiled in large qnantities, and being stirred with '*razi*,' remains exposed in open tubs until fermentation takes place when the liquor is poured into close earthen vessels. It is generally buried for several months in the earth, by which means the fermentation is checked and the strength of the liquor increased. It is sometimes made stronger by boiling.

The *saki* of the Japanese is a beer which a little resembles wine. It is of an unpleasant taste, but it is drunk at every meal and sold at all the taverns. Before use, it is warmed in a tea kettle and drank warm out of flat lacquered ware cups. It intoxicates rapidly, but the inebriation speedily vanishes, leaving behind a disagreeable head-ache.

The Chinese prepare, from rice, different sorts of wines, of a red, white, yellow or pale colour. The best called Mandarin wine, is strong and will keep for many years. It is wholesome, but expensive, and is only used by the higher classes. some of the rice wines are highly perfumed. A strong spirit like brandy is distilled from the lees and is called sam-su and shon-chu.

Rice Sprouts.

In China, rice in husk is called *kup*. Rice germinated and dried is used as a peptic and tonic remedy, having much the same effect as the germinated barley or malt. The sprout is sometimes rejected, sometimes retained.

Yellow Rice.

By the following process a rice dish can be prepared which is favourite with the Japanese. Take one pound of rice, wash it clean, and put it into a saucepan which will hold three quarts ; add to it half-a-pound of currants picked and washed, one-fourth ounce turmeric powder, previously dissolved in a cupful of water, and a stick of cinnamon, pour over them two quarts of cold water, place the open saucepan on a moderate fire, and allow it to boil till the rice is dry : then stir in one-fourth pound of sugar, and two ounces of butter : cover up, and place the pan near the fire for a few minutes, then mix it well and dish up.

USEFUL TIPS.

To make a lemon twice as useful, heat it before squeezing, it will yield more juice.

Rust may be removed from iron by the use of emery paper or powdered bath-brick mixed with oil.

Seismologists have concluded that earthquakes are numerous where the gradient of the surface is considerable, and rare where the gradient is small.

It has been estimated that since the invention of printing in Europe in the fifteenth century the output of the world's book presses has amounted to about 16,500,000 titles, of which some 4,400,000 have been printed since 1900.

To remove superfluous hair from the face, neck and arms, the following method is used : One part Resorcin is ground in a mortar with 50 parts glycerine, gradually adding 100 parts distilled water. This mixture is placed on the skin and rubbed off with pumice stone.

The substance known as Tabasheer, which is a word of Sanskrit origin (Tavakashiri, meaning cow's milk,) is only procured from the female species of bamboo. It so far resembles silex as to form a kind of glass when fused with alkalies. It is also unaffected by fire and acids. It is employed medicinally in the cures of all sorts of paralytic complaints, flatulencies, and poisons.

To clean a lace wring out a cloth in peroxide of hydrogen, (but without washing it) spread it over the lace, and press with a warm iron. Magnesia block rubbed well into lace, which should afterwards be put away in blue paper, will also act as a cleanser.

Linen bags especially those that are used for shipping fertilisers, are rendered more durable by dipping them into a solution of potassium silicate or sodium silicate (water glass). They are then wrung out well and dried. The solutions of the chemicals must be rather dilute.

Gold wire is formed by drawing a cylindrical rod of the metal, as pure as may be, through a series of holes punched in an iron plate, diminishing progressively in size. The gold as it is drawn through becomes hardened by the operation, and requires frequent annealing.

To make starch that will not stick to the irons, use one tablespoonful of salt for a medium size wash. It helps also to make the colours fast. In the last rinsing water put a tablespoonful of alum. It lessens the tendency to burn.

When used in proper proportion to other foods sugar is a valuable article of diet. As a source of fuel it is extremely economical. A pound yields 1,829 calories of energy. At six cent a pound it provides 100 calories of energy for one-third cent, a figure lower than that for almost any other of the familiar food materials.

SCIENTIFIC AND INDUSTRIAL TOPICS.

Fossil Dust as Drug in China.

China is perhaps the only country where fossil teeth and bones have a considerable value, quite aside from their scientific interest. Fossils have been used as fertiliser, it is true, where they occur in cave deposits or rich pockets, and have been ground up and used for their phosphates. But in China they have quite another use as medicine and have been mined for centuries to supply the Chinese drug-shops with "dragon's teeth" and 'dragon's bones', a regular article of the Chinese pharmacopoeia. There are, it would appear, four ways of administering them. They may be ground to powder in a mortar and eaten raw, or they may be ground and fried with oil in a skillet, or the powder may be stirred up with sour wine and either drunk off fresh or the mixture left to settle, , decanted, and the clear liquid drunk. They are specific for certain nervous diseases, heart troubles, and disorders of the liver. It may be pointed out as an explanation, that mixing with sour wine would result in a combination of bicarbonate and acid phosphate of lime that might really have some medicinal value.

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The Radiance of Radio.

Numerous great inventions have found their first application and use as toys and sources of amusement. Their value as practical aids in civilization came as a later development. That is true of the radio, with the difference that the radio was in the beginning limited to scientific and governmental use. Its popularity became established when it was discovered that a new medium for the introduction of audible communication available to everyone had been discovered.

The radio has overleaped national boundaries. While most of the broadcasting to which the world is "listening in" is of a sort that appeals to entertainment rather than instruction, the radio as an educational and national acquaintanceship feature is on the threshold of a development that promises an entirely new era in the world's history.

The radio is bound to be a mighty factor in "making the whole world kin". Discord and wars usually find their origin in differences that might easily have been obviated through popular understanding, and it is not too much to say that the radio itself is going to be one of the greatest peace promotion plans ever devised.

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Storing the Brain while Asleep.

The recent experiments in teaching radio to students while they sleep, conducted at the United States Naval Aviation Training School, Pensacola, Florida, have aroused widespread interest and curiosity relative to the possibilities of what seems to be an entirely new and unique method of teaching. It should be said at the beginning that people who are lacking in imagination, that is, those finding it difficult to visualize things, are not the best type of students for the method. People of this type rarely dream. The experiments at this school have demonstrated to entire satisfaction that a student who does not dream can learn little under the system. Students seem to be able to learn while they sleep in direct proportion to their ability to visualize or imagine things in their mind's eye.

This is how it is done. The students are first made familiar with the sounds (dots and dashes) that represent the letters of the alphabet, a few at a time. The students have the head telephone sets strapped on and the instructor takes the control key and makes the Morse characters that represent the letters and combinations of letters with which the students have become familiar calling them out loud as he makes. them. Later the students are required to call them out and write them down. When they can do this with a fair degree of accuracy, they are ready to learn while they sleep. All they have to do is to go to sleep trying to visualize the letters and words, from the sounds that they have learned represent them

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Mangrove Bark Curiosity.

It is well known that the mangrove tree in tropical countries grows very largely on the banks of streams affected by tidal waters. This is to some extent rather a drawback to the use of this material, as the tannin in the bark is often impregnated with salt, and, if it accumulates in the liquors, is apt to make a thin, flat leather. However, the fact that mangrove branches overhang the tidal water seems to be useful in rather an unexpected direction, for in places where the mangrove branches overhang the trees below the water level, oysters attach themselves to the twigs. When the oyster harvest commences the branches are simply cut away with a fine crop of oysters attached. This is perhaps the only instance known of food being connected with tanning materials.

Weather by Wireless.

One of the highest practical advantages of wireless telegraphy is the facility which it gives for the rapid dissemination of weather forecasts over a wild area. The British Air Ministry has developed an excellent system of weather signals, and in order to assist everyone possessing a wireless receiving set in receiving and interpreting the various reports and forecasts the Department has prepared a Wireless Weather Manual. This booklet explains the classes of different information transmitted and gives instructions also in the making up of weather charts. This little manual should prove of great assistance in countries where wireless weather reports are being developed.

Uses of Tin.

Pure tin is used commercially only to a very limited extent. It is, however, employed in making such apparatus as evaporating basins, infusion pots, distilling pipes, stills, ect, but more especially for tin foil which is used for silvering mirrors and for wrapping purposes.

At one time, pure tin was largely used for kitchen utensils because it did not tarnish and is proof against acid liquids, but they had to be made heavy and so the metal was not found to be practical.

It is also employed in coating utensils of copper and iron.

The most important use to-day of tin is in the manufacture of tin plate. This consists of sheets of iron or steel thinly coated with tin by being dipped in a molten bath of that metal.

Terne is a similar product, but the bath in this case is of lead and tin mixed. Tin is used in such alloys as pewter and solder. It is also employed in compounds in dyeing, colour printing, and silk industries.

Stannic oxide is used in the ceramic industry, and stannic sulphide is employed as a gilding material.

Synthetic Sugar.

An Australian scientist announces that in his laboratory he has been able to produce a synthetic sugar which differs in no way from the product of the cane. Experts, according to the report, have been unable to distinguish between the artificial product and the genuine grown variety.

The actual process of manufacture is at present a carefully guarded secret. The principal difficulty to be overcome was the production in the laboratory and by chemical means of condensation of certain elements which is effected by sunlight during the growth of the cane in the field. Careful experimentation has solved the problem, says the inventor of the process, reproducing perfectly the actual conditions of growth.

Common Salt in Peace and War.

Bleaching powder and liquid chlorine serve as raw materials for the manufacture of those deadly products such as phosgene, chlorpicrin, arsenious chloride, mustard gas and many others. It is possible, by using the chlorine liberated from common salt, to produce huge quantities of a terrible series of compounds. In addition to these noxious bodies, chlorine is consumed in thousands of tons for the manufacture of many explosive materials such as ammonium perchlorate, dinitrophenol and picric acid.

Common salt is indeed a powerful substance in war, for besides supplying the chlorine it gives immense quantities of caustic soda and alkali for making high explosives and soap. The latter is an innocuous material, but in war-time its manufacture is essential to obtain that most important bye-product glycerine, the basis of nitro-glycerine and cordite. In fairness to common salt, however, it must be stated that although it is vindictive in time of war, it is vital to our existence at all times, and there is hardly a single industry which is not dependent on it or the important series of products to which it gives rise.

Wood Drying.

One of the greatest difficulties in the wood industry lies in the drying of the wood, the seasoning process. Wood is difficult to dry because the small cellules deep in the wood remain alive for a long time and a living cell does not easily lose its water. It can only lose its water after it has been killed by the action of a gas or vapour. Accordingly, fresh wood was subjected to the action of the vapours of benzine in an autoclave. The cellule was killed in this manner and under the action of hot air the drying of this wood then took place very rapidly.

The Age of Aluminium.

The possibilities for the employment of aluminium and its alloys are practically unlimited and only utilised to a very restricted extent, and it may be fairly said that this metal has only just commenced its triumphal progress. It has the advantage of low weight, great durability under atmospheric influences, great strength and, in contrast to copper is non-poisonous. Its employment for aerial craft is already known and, in recent times, it has gained great popularity for kitchen and cooking utensils. It will not even be affected by such strong acids as sulphuric acid and nitric acid, though it will dissolve in hydrochloric acid and strong lyes. There is, however, a great future for aluminium alloys, of which much will be heard in the near future.

The Cement "Gun."

This is of a similar nature to metal spraying pistol and pneumatic paint sprayer. A plant includes an airtight container for the sand and cement, which are mixed together dry before being introduced through a bell-closed hopper. At the bottom of the container is a horizontal revolving feed wheel which brings small quantities of the mixture periodically near an opening through which they are projected by a rush of compressed air into a pipe and so reach the nozzle. Here a fine spray of water impinges on to the mixture as it flies through, and in this way sufficient moisture is added to render the cement active. On striking a clean surface a good part of the sand rebounds and falls away, but as soon as a film of cement has been formed the sand also begins to stick, and loss quickly diminishes. The fallen sand has, however, not been wasted entirely, as its damping action consolidates the cement and ensures good adhesion. The mortar deposited by the "gun" is extremely dense and strong, unabsorbent, and impermeable. The "gun" may be used for all manner of purposes where a layer of cement is required on a support of any kind. For example, cottage walls are constructed by shooting "gunite" over a layer of metal reinforcements backed by tar felt; both attached to a wooden framing. In the same way factory walls of large size have been built up, to a thickness of two inches. In mines, the "gun" comes in useful for lining shafts and roofs, protecting timbers from fire and decay, and walling up. Masonry structures are quickly repaired by shooting "gunite" into cracks and hollows, or by covering the original work over with a layer of concrete. Metal chimney stacks have been repaired satisfactorily by surrounding them with wire netting and applying a layer of gunite. The rapidity of the process is one of its attractive features. An outfit of the second size will easily coat 185 square feet with one inch of material in an hour, only six men being needed for the work.

FORMULAS, PROCESSES AND ANSWERS

Exterminating Fleas on Dogs.

179 K. N., Hyderabad. Writes, "Please help me in exterminating fleas on dogs."

The following are some of the exterminating agents : soap water ; carbolic acid in dilute alcoholic solution ; flower of sulphur, either used as a powder or mixed by agitation with water containing tannin, as dried sumach, tea, etc. A little of the carbolic solution may be mixed in with the soap water, and used as a wash or sprinkled in infected localities. Flowers of sulphur contain sulphurous acid which is fatal to the insect. Sulphate of magnesia solution may be used as a wash. Sumach powder, etc. give excellent results.

Roof Slates.

225 A. C., Jammu. Wants to learn the characteristics of roofing slates.

Roof slates are quarried from mine of fossil or compact stone that may be readily split into even, smooth, thin laminas. There are several varieties of this valuble mineral, the prevailing colours being gray, blue and brown. But the tints are various : and slates are often marked with streaks of a different colour from the ground. Slate is principally used in the covering of houses, for which purpose it is infinitely superior to thatch or tiles, and is far less expensive than lead. Good roofing slate should not absorb water ; and it should be so compact as not to be decomposed by the action of the atmosphere. When properly selected roof slates are of almost perpetual duration ; but those which are spongy and imbibe moisture speedily get covered with moss, and require at no very distant period, to be renewed. It must be remarked, however, that the use of slates in the covering of houses is entirely European.

Beverages in Powder Form.

182 M. R., Ajmer. Requests us to publish recipes for soda and lemonade powder.

(1) Soda Powder—

(A)

Take

Crushed sugar	½ lb.
Supercarbonate of soda	1 oz.

Mix thoroughly and divide into 8 parts and put in paper packets.

(B)

Also pack 4 dr. of citric acid in 8 paper packets, i. e , ½dr. in each.

One packet of (A) with one of (B) dissolved in a pint of water will yield good soda water.

(2) Lemonade Powder—

Take

Loaf sugar	1 lb.
Citric or tartaric acid	½ oz.
Lemon essence	½ oz.

The first two ingredients must be in finely powdered form and thoroughly mixed. The last is then triturated into the mass.

One tablespoonful of this powder dissolved in a glass of water will yield fine lemonade.

Artificial Lemon Juice.

348 V. S. S., Jaipur. Requests us to publish the recipes of artificial lemon juice and sweet milk powder.

Citric Acid	6	oz.
Potassium Carbonate	½	,,
Pure Sugar	8	,,
Oil of Lemon	1	dr.
Water	4	pint.

Sweet Milk Powder.

Dissolve ½ dr. sodium carbonate in 1 oz. water. Sweeten 1 quart milk with 1 pound sugar. Add the milk to the water and boil down the whole to thickness. Spread the mass in a layer on a plate and hold over a slow oven. The mass will become crisp and can be easily powdered.

Mica Paint.

95 H. M. S. C, Patiala. Requests us to publish a recipe of mica polish.

Mica paint is generally applied over other paints to produce a peculiar silvery or scaly glittering appearance, varying in different lights. It is specially effective on certain classes of wood work intended for decorative purposes. It may be prepared by incorporating, 6 lbs. of clean mica powder in 1 gallon of pale boiled oil. The resulting paint is nearly transparent but small quantities of colour may be introduced. The best effects are however obtained by using it over other colours.

To prepare the mica for the above purpose put the sheets in a crucible and make them red hot and boil in dilute hydrochloric acid. They are then to be ground in water, dried and powdered.

Extraction of Santonin.

63 U. M. D., Bombay. Asks, "How is the drug santonin extracted?"

Santonin is a crystalline principle prepared from santonica, the dried unexpanded flower-heads (capitula) of wormwood, *artemisia maritima*, var. Stechmanniana. The drug is extracted by digestion with lime and water and from this solution after suitable concentration and acidification, the santonin in an impure form slowly precipitates. It has then to be purified by washing with hot water and dilute ammonia, and by treatment with animal charcoal, and finally, it is dissolved in alcohol and crystallised from that solvent. The crystallisation has to be effected in a dark place, otherwise the product is converted by the actinic rays into a yellow compound. The yield of santonin varies from 1 to 2 per cent.

Curing Vanilla Pods.

127 A. K. A., Kandy. Wants a process of curing vanilla pods.

The Vanilla bean is the fruit of a climbing orchid, a native of South America. The drying and curing of the pods after being gathered requires great attention and care. For the vanillin, which is the characteristic odour and flavour bearer of the bean, is developed during a process of fermentation, which goes on during the curing and drying.

One of the processes in vogue is as follows. In Mexico as soon as the pods are gathered they are piled into heaps in ashes to protect them from the rain and the sun, and in a few days when they begin to shrivel, they are submitted to the sweating process. This is carried out in two different methods, according to the weather at the time. If it is warm and fine, the pods are spread out in the early morning on a woollen blanket and exposed to the rays of the sun. About mid-day the blanket is folded over the pods, and the bundle left in the sun for the remainder of the day. In the evening all the vanilla is enclosed in air-tight boxes, so that it may sweat all night. The next day they are again exposed to the direct rays of the sun. They then become of a deep coffee colour, the shade being deeper according to the success of the sweating operation. If the weather is cloudy, the vanilla is made into bundles, and a number of these are packed together in a small bale which is first wrapped into a woollen cloth, then in a coating of banana leaves and finally the whole is enclosed in a thick matting and sprinkled with water. The bales containing the largest beans are then placed in an oven which is heated to a temperature of 140° F. When the temperature has fallen to 113°, the smaller beans are placed in the oven, and this is now tightly closed. After 24 hours the smaller beans are taken out, and in another 12 hours the larger ones. During this process the vanilla has sweated considerably, and has acquired a fine chestnut colour. The pods are spread out on matting, and exposed every day to the sun for about 2 months. When the drying is nearly complete, sun heat is no longer required, and the pods are spread out in a dry place till they are sufficiently dry. They are then tied into bundles, and are ready for the market.

Vermicelli and Maccaroni.

183 S. E. C., Saidapet. Requests us to publish a recipe for vermicelli.

Vermicelli is the flour of a hard small-grained wheat, made into dough, and formed into smaller pipes or threads than maccaroni, and then dried until hard. It is drawn out into slender cylinders, more or less tortuous, like worms, whence the Italian name. Maccaroni is made of a less compact dough than vermicelli.

Vermicelli may be made economically by the following prescription :—

Best flour (Vermicelli)	21 lbs.
White potato flour	14 lbs.
Boiling water	12 lbs.

The mass will afford 45 lbs. of dough and 30 of dry vermicelli.

Artificial Flowers.

187 K. C. M., Salem. Desires to learn the process of preparing artificial flowers.

Artificial flowers are made from various fabrics consisting of cotton, silk, satin and velvets as well as paper. The various parts of the flowers are cut out of the cloth by means of suitably shaped dies, and from these the flowers are built up by the deft handling of skilled workers. For some purposes the cloth is dyed in the piece previous to cutting up, and this is especially true in case very brilliant colours are required. Again where considerable fastness to light is desired it is best first to mercerize the cloth with caustic soda, bleached with chloride of lime, and dye with the acid colours. For most purposes, however, the cut pieces are dyed either in small packages or single, or in some cases by means of an air spray. Considerable skill and ingenuity must be exercised in order to obtain the proper shading and blending of the colours to imitate the natural colouring of the flowers. The dyes employed for this purpose are those soluble in alcohol, though sometimes the dye is used dissolved in water and the solution diluted with an equal volume of alcohol. The object of using an alcohol solution is to have the dye in a form in which it will dry quickly on the cloth.

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Purity of Musk.

186 S. C. A. J., Bangalore. Writes, 'How to test purity of musk'.

Pure musk exhibits a highly characteristic behaviour towards caustic alkalies, such as soda, potash, or liquid ammonia, and these substances are therefore employed as tests for purity. On suffusing a sample of musk with a dilute solution of an alkali, a considerable intensification of the odour will become evident within a short time ; if the alkali be concentrated or the sample warmed, the smell of musk disappears entirely and the liquid evolves the pungent odour of pure ammonia. Hot water dissolves about 80 per cent. of the total weight of musk, strong alcohol about one-half. When heated in an open porcelain basin, musk burns with the liberation of a repulsive, empyrenmatic smell, and leaves behind about 10 per cent of ash.

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Artificial Musk.

The same gentleman enquiries how artificial musk is prepared.

Artificial musk may be prepared by mixing toluol with the halogen compounds of butane, and boiling the mixture, with an addition of aluminium chloride or bromide, under a reflux condenser. The product of the reaction is then mixed with water and distilled with steam, the fractions passing over it at 170-200° C. being collected and treated with fuming nitric and sulphuric acid. The resulting product is washed with water and recrystallised from alcohol, and furnishes yellow white crystals, smelling strongly of musk ; these when dissolved in alcohol and treated with a trace of ammonia or ammonium carbonate, yield a liquid very similar to musk tincture.

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Converting Starch into Sugar.

1264 S. S. S., Cuttack. Asks, "Could you kindly inform me how starch is converted into sugar ?"

Sugar obtained from starch by the chemical process of hydrolysis is known as starch sugar or commercial glucose.

For this purpose starch from potatoes or maize is chosen. It is then made into a cream with cold water, and poured into boiling dilute sulphuric acid. Heating is continued until starch is no longer present, and the hydrolysis is considered complete. The liquor containing the dextrose is next neutralised with chalk, made into a cream with water, and the calcium sulphate is separated by means of a filter press. Finally the filtrate is decolourised by animal charcoal and concentrated in a vacuum pan. Before concentration, however, any trace of alkali present should be carefully eliminated. The resulting product contains about 70 per cent of dextrose. When pure dextrose is required it is crystallised from methyl alcohol.

Discharging Alizarine Dyes.

112 N. V. K., Madras. Requests us to throw some hints on discharging alizarine dyes in cotton printing.

With alizarine dyes it is usual to discharge the mordant and thus prevent the fixation of the dyestuff. The method therefore consists in impregnating the cloth with the mordant, such as chromium acetate, and then printing with a discharge paste, containing sodium citrate, which on subsequent steaming, renders the mordanting oxide soluble, so that when the piece is passed through the washing bath, the mordant is dissolved away wherever the discharge has been printed. On subsequently dyeing the cloth with the dyestuff, the latter is taken up on those parts where no discharge has been printed and a coloured pattern is thus produced.

Dental Cream.

1787 S. N. B, Faridpur. Wants a recipe for dental cream with antiseptic properties.

A good tooth paste may be prepared with the following formula.

Precipitated chalk	160	grains.
Soap powder	45	,,
Wheat starch	45	,,
Carmine	1	,,
Oil of Peppermint	30	mum.
Oil ot geranium	30	,,
Oil of Eucalyptus	60	,,
Oil of Clove	12	,,
Oil of Aniseed	12	,,

Mix together and thoroughly incorporate. Make into a suitable paste by adding glycerine and alcoholin equal parts. Put in collapsible tubes.

Fermenting Cocoa Beans.

127 A. K. A., Kandy. Asks "how to ferment cocoa beans ?"

Cocoa is the product of the fruit of the chocolate-tree, *Theobroma Cacao.* The gathered pods are submitted to a process of airing, which requires much experience and delicate skill, as upon it depends the preservation of the cocoa, and the development of its flavour. The seeds are first carefully extracted from the pods, and placed to ferment. They are fermented in heaps covered by plantain leaves within the sweat house, a closed chamber, exposed to the sun. The sweating is best performed in deal boxes of suitable size, provided with covers. The sides are perforated near the bottom, to admit of the cocoa draining. Here the seeds remain for 3 to 10 days, at a temperature of about

60°C. losing much water, and their bitter and astringent principle, becoming lighter, acquiring a mild, agreeable flavour and a fine cinnamon hue, and admitting of their easy separation from the husk by a slight pressure. They are then transferred to the drying house, a wooden shed, provided with a moveable roof, and thoroughly ventilated. Here they are spread evenly on mats or on a platform, after having been rubbed with a little red earth. Excessive heat is avoided, and the beans are constantly stirred about. The beans remain here until perfectly dry, and should show no trace of mildew. They are finally packed in bags.

Ginger Powder.

182 M. R., Ajmer. Wants recipe of a good ginger powder.

Take

Carbonate of soda	30	grs.
Powdered ginger	5	,,
Ground white sugar.	1	dr.
Essence of lemon	2	mm.

Add the essence to the sugar, and the other ingredients. Mix thoroughly and put up in blue packets.

Take tartaric acid 30 grains and put in white packets. Directions for use : Dissolve the contents of the blue paper in water ; stir in the contents of the white paper, and drink during effervescence.

Table Salts.

179 K. N., Hyderabad. Wants to prepare table salts.

Table salts are prepared from fine-grained lump salt simply by grinding. Fine-grained lump salt, in its turn, is made by actually boiling the mineral brine of Europe in small-sized pans. The temperature of the boiling brine is 107·5°C. and the salt as it settles-out is raked off the fire-plates to the side of the pan. Every eight to twelve hours the salt is withdrawn from the pan and placed in wooden boxes. On cooling, the hot brine still contained in the salt crystallises out and knits the whole into a solid lump which is then knocked out of the box and dried in a drying chamber.

Cocoa Powder.

116 T. N. P., Cuddalore. Requests us to publish a method of preparing cocoa powder.

Cocoa is one of the few natural products which serves equally well as food or drink. The powder or essence, which is in domestic use in Western countries as a beverage is the dry cake (ground into flour) of the kernel of the cacao bean, after it has been separated from the bean itself, and after the greater percentage of its natural oil or butter has been extracted by crushing, and pressing under a hydraulic press.

Now cacao nibs contain about 50 per cent of fat. Naturally this high content of fat makes it unsuitable for the production of any beverage. A simple process of preparing fat-free cocoa powder is as follows. The nibs are submitted to a lengthy boiling in water, when the fat rising to the surface is skimmed off and purified. The nibs, partially defatted, are placed in linen bags and subjected to pressure at a temperature about the boiling-point of water to remove further portions of fat and moisture. In this way more than half the fat may be easily extracted but the resulting cocoa powder is of poor quality. It loses its fine aroma and colour from prolonged boiling in water and is moreover, liable to turn mouldy owing to the presence of moisture which it might still contain. The method has therefore fallen into disuse. The modern method is to run the cacao mass from the grinding mills direct into a press, where it undergoes extreme pressure applied hydraulically.

Damp-proof Glue.

1475 J. D. R., Kotah. Wants a formula of damp-proof glue.

Dissolve white glue (20 parts) in water (20 parts) by sufficient heat ; mix 2 parts of potassium bichromate with 10 parts of water. Mix the above two solutions, stirring well, and put the mixture in a tin box to congeal. When using, melt the preparation in a cup standing in boiling water. Furniture may be exposed to the sun for some time after using the glue.

Re-sharpening Files.

237 G. A. C., Dum Dum Cantt. Requests us to publish the process of re-sharpening files.

Worn out files are first carefully cleaned with hot water and soda ; they are then placed in connection with the positive pole of a battery made as follows. The bath is composed of 40 parts of sulphuric acid and 1000 of water. The negative is formed of a copper spiral surrounding the files but not touching them, the coil terminates in a wire which rises towards the surface. When the files have been in the bath for 10 minutes, they are taken out, washed and. dried. All the hollows of the files will be found to have been attacked appreciably : but if the sharpening be not satisfactory they may be treated again as above. The files thus operated upon look like new ones.

Ham and Bacon.

137 P. Z. Maungdaw. Wants a process of curing ham and bacon.

Of bacon and hams the former is made from the sides and belly of the pig, and the latter from its hind legs. The process of curing may be effected indifferently by the employment of salt, or sugar, or both ; but the first is by far the most commonly used. After being impregnated with salt or sugar, and allowed to remain a certain time in the solution, the bacon and hams are taken out, dried and smoked.

The proper ingredients and exact proportions to make a suitable pickle for curing hams are given below. The meat must be so cured that it will keep in hot weather, with the use of as little salt as possible. This end may be achieved by taking—

Salt (coarse or abum salt)	1¾	lb.
Saltpetre	½	oz.
Molasses	1	pint
(or Brown Sugar	1	lb.)
Saleratus	1	tea spoonful

Add these ingredients to 1 gallon of water. Bring the liquor to a boil, taking care to skim just before it begins to boil. Allow the pickle to cool and then pour it over the meat until entirely covered. The meat should be packed in clean, tight cask, and should remain in the pickle 6 or 7 weeks, when it will be fit to smoke.

Manufacture of Eraser Rubber.

259 G. M. C., Bombay. Writes, "Kindly throw some hints as to how rubber erasers, for ink or pencil, are made."

For the manufacture of eraser a suitable composition of crude rubber is first made containing as fillers chiefly pumice powder, glass powder, whiting and barytes in large quantities. The mass is then calendered into sheet and doubled up to the requisite thickness. The sheet, which should be free from blisters, is compressed in metal moulds. These are provided with the various designs which are to be imprinted on the product. A simple cold press will achieve this end, the pressure being maintained for about three hours. The compressed sheets of rubber obtained in this way are finally cut up in desired size and vulcanised in chalk at a low temperature.

Glycerine and its Uses.

13 H. C. L., Delhi. Asks, "How is glycerine prepared and what are its industrial uses ?"

Glycerine is obtained as a bye-product in the saponification and hydrolysis of fats in soap and candle making. Some difficulty is experienced in recovering glycerine from spent lyes on account of their dilution and the impurities which they contain. The process of recovery consists essentially in precipitation of residual soap with milk of lime, evaporation to crystallise as much of the sodium chloride as possible, neutralisation with acid to precipitate albuminous matter, precipitation of remaining traces of fatty matter as the salt of a metal such as iron, copper or aluminium, and a second evaporation whereby more sodium chloride is separated. This crude glycerine still contains some salt, and compounds of sulphur, and arsenic. Refined glycerine, free from mineral matter, is prepared by distilling the crude product with superheated steam at 210°C., the distillate being collected in a series of vertical pipes. The first pair of these pipes are not artificially cooled, so that glycerine condenses almost alone, the steam and remainder of the glycerine being collected in later pipes of the series, which are jacketed with water. The distilled glycerine is decolourised by animal charcoal which has been freed from soluble salts by washing in hydrochloric acid. Finally, concentration is effected in a vacuum pan.

Glycerine is a sweet colourless liquid of great viscosity ; and miscible in all proportions with water and alcohol. It dissolves many substances such as metallic salts, which are soluble in water. It is most largely used now for the manufacture of nitro-grycerine, a powerful explosive. Minor uses are in pharmacy, soap making, filling apparatus in chemical experiments, and sweeting wine.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of INDUSTRY are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

1A. V. V. R., Bezwada. For trade mark registration enquire of De Penning and De Penning, 10, Government Place East and H. V. Williams & Co., Suite No. 20, 8, Esplanade East, both of Calcutta.

1B. P. K. R, Rajahmundry. Washing soda is chemically known as carbonate of sodium. It is manufactured on a largely scale according to different chemical processes, which are complicated to a degree. We do not think that the industry will prosper unless a large capital is invested in it. For processes you are referred to any text book of chemistry, specially to the Industrial Chemistry by Martin, Vol. I.

1C. S. L. G, Rangoon. For provisions and oilman stores please enquire of Messrs. Carr & Co. Ltd., Norton Bldgs, Old Court House Corner; H. A. Asmal, 12, Amratalla Lane and Hajee Ahmed & Sons, 24 and 25 Municipal Market; all of Calcutta. For toilet soaps and scents enquire of Messrs P. Mukherjee & Co, 29 and 30, College Street Market and Mohamed Emanulla & Co., 8 and 9, Colootola Street; both of Calcutta. Stationery articles may be bought of Nilmony Halder & Co., 106. Radhabazar and Dass & Co, 60, Sikdar Bagan Street; both of Calcutta. Fancy goods may be had of Mohamedally Jaferjee, 37-4 and 37-5 Canning Street; Singh Sarkar & Co., 125, Harrison Rd., and K. B. Nan, 210, Radhabazar Street; all of Calcutta. You may learn soap making at the School of Chemical Technology, 30-2-4, Doctor Lane, Entally, Calcutta and Rijen Soap Works, 8, Kinnu Sarkar Lane, Off Khurut Road, Howrah.

4 F. B., Secunderabad. Process of softening horn appeared in September 1921 issue of INDUSTRY. Horns are used by cutlers as handles of knives, etc. Your enquiry regarding selling horn appears in the Trade Enquiry columns and the responses received will be duly redirected to you.

5 J. K. D., Chittagong. No such thing is known.

6 M. S. B., Belgaum. We do not deal in any article, we only furnish our constituents with necessary information. Knitting machine may be bought of Economic Hosiery Mills Ltd., 20-1, Lal Bazar Street, Calcutta and M. Hridaya Narain, 32, La Touche Road, Lucknow.

7 K. C. M. S., Salem. For tin box enquire of Bengal Box Manufacturing Co., 79, Raja Nabokissen Street, Calcutta. For technical books please enquire of Messrs Chakraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta. An article on canning appears elsewhere in this issue.

8 N. K. J, Moradabad. For the machine required please write to Oriental Machinery Supplying Agency Ltd, 20-1, Lal Bazar Street, Calcutta.

9 S. M. B., Akola. It requires very high temperature to melt aluminium.

11 S. M. P., Kalimpong. Regarding any difficulty met with in the preparation of citrate of lime, etc please enquire of Mr. S. K. Mitra, the author of the book.

12 T. S., Poona City. Seeds may be supplied by W. Atlee Burpee & Co., Philadelphia, Pennsylvania, U. S. A. Most of the formulas you required appeared in back volumes and some of them will be published in the current volume also.

15 P. L, Coringa. Eye-lets used in calendars are manufactured by F. N. Gooptu & Co., 13, Beliaghata Road, Calcutta.

16 L. P. S., Katni. For the required picture please enquire of any transfer picture dealer.

17 P. D., Quetta. No such machine is known. For cardboard boxes please enquire of Messrs H. L. Sett and Sons, 8, Nilmony Mitter Street and Kundu & Dass, 20, Gour Laha Street ; both of Calcutta. You may get paper bag prepared locally per order. For rubber stamp in different languages please enquire of B. N. Bysack, 1-1, Ram Chand Ghose Lane, P. O. Beadon St., Calcutta. You may try the following directories : Indian Directory to be had of Messrs Thacker Spink & Co., Post Box 54, Calcutta ; The Indian Mercantile Directory to be had of Laxmichand Dossabhai & Bros, Rajkot, Kathiawar ; The Business Directory of India, Burma and Ceylon to be had of the Kanara Press, Madras and 'The Directory of Indian Goods and Industries to be had of Indian Industrial and Commercial Congress, Old Telephone Bldgs, 19, Bank Street, Fort, Bombay. For the grass required enquire of Messrs G. Ghosh & Co., West End, Darjeeling. For brass seals enquire of R. P. Ganguli & Co., 8, 9, 10, and 11, Mati Seal Street and N. G. Roy, 93, Boloram Dey Street ; both of Calcutta.

19 G. R. V., Shahpur. Formula of syrup hypophosphite of lime appeared in June 1922 issues of Industry. For hand power ice machine enquire of Messrs Burn & Co., 7, Hastings Street, Calcutta. Formula of laundry soap appeared in October 1923 issue. You may write to International Correspondence Schools, Box 3095, Scranton, Pennsylvania, U. S. A. for learning Homeopathy by correspondence.

20 B. S. C., Ludhiana. For perfumes enquire of L. R. Bernhault Braunschwig and Hidalgo G. m. b. H. Bad Lanterberg, H ; both of Germany.

22 B. N. S., Jaunpur. Sugar crushing plant may be supplied by B. D. Bery & Co., 43, Ripon Street, Calcutta.

23 T. S. S. N. S., Vallaur. Locks are manufactured by T. L. Sharma & Co., Akhrabad Road, Naurangabad, Aligarh, P. Heeralalgha, Naurangabad, Akrabad Road, Aligarh and S. Tulsi Ram & Sons, Malipara Street, Aligarh City.

24 L. N. L., Patna City. You may wash your cloth with soap. Other queries are not in our line. You may consult an Ayurvedic physician.

29 D. P. B., Aligarh. For transfer picture of required design please communicate with G. Geck & Co., 54, Furtherstrasse 54 and Sixt & Co., Bayrentherstrasse 28 A ; both of Nurnberg, Germany. Tin sheets are imported by Anandji Haridas & Co., and Chandra Kumar Guha ; both of 20, Dharmahatta Street, Calcutta.

31 E. T., Madras. Pictures may be had of Messrs. S. Dastidar & Co., 35-3, Harrison Road, and Art Pictures, Commercial Union, 15K Lindsay Street; both of Calcutta.

32 Q. F. A., Quetta. Your query has already been replied to.

33 H , Shikerpur. We do not deal in any article : we only furnish information to our constituents. For looms please enquire of Messrs Bros Partner & Co, 35, Ezra Street and Indo-Swiss Trading Co, 27, Pollock Street ; both of Calcutta.

37 H. B. N. S., Patiala. The address of dental school in Calcutta, is Calcutta Dental College and Hospital, 12-1 Esplanade East, Calcutta. You may also learn dentistry in the School of Dentistry, 26A, South Parade, Bangalore and Mani Ram Dental College, Amritsar.

38 S. A. R. C., Hyderabad. For technical books please enquire of Messrs Chakraverty Chatterjee & Co., Ltd., 15, College Square, Calcutta.

41 K. C. J , Almora. Picture post card may be supplied by P. J. Gallais & Cie, Rue Vignon 38 ; P. Racine & Cie boul Sebastopol 96 and Tuck Raphael & Sons Ltd, Rue Mantel 6 ; all of Paris, France.

42 P. C. M. S., Razole. Chemicals you require may be had of Butto Kristo

Paul & Co, 1-3, Bonfield's Lane, Calcutta.

48 E. M. T., Bhaloni. You may use rain water or distilled water. You will have to pump out air from the jar in order to make it vacuum. It will be advisable for you to use porcelain jar. An article on canning appears elsewhere in this issue.

49 G. A, Jullundur. An article on construction of dry cell appeared in the last issue.

50 A. M. W., Maruteru. For paper enquire of Mukherjee Dutt & Co., 31, Jackson Lane, Calcutta.

54 A. N. B., Madhupur. Talc is a silicate of magnesia found in small quantities embedded in some of the harder rings of rocks. It is a very curious substance splitting easily into thin plates which have a kind of semi-metallic lustre. It is used in making toothpowder, cosmetics, polish for alabaster, porcelain paste, crayons, etc. Soapstone is a massive variety of talc, which when pure and compact is much used as a refractory material for lining furnaces, being infusible in any ordinary furnace heat. It is easily turned in the lathe or cut with knives and saws and is made into culinary vessels. When very strongly heated it loses the small portion of combined water which it contains and becomes harder and susceptible of polish. In this state it is made into jets for gas burners, which have the advantage of not being liable to rust or corrosion. When reduced to power, it is used like plumbago as a lubricator and to diminish friction, as well as give a surface to some kinds of paper hangings. It is also used as filling agent, in soap manufacture. Soapstone is sold at the rate of Rs. 2 to Rs. 3 per md.

55 B. T., Pegu. Rubberstamps are manufactured by B. N. Bysack, 11, Ramchand Ghose's Lane, P. O. Beadon Street, Calcutta. Tablet making machine may be had of Calcutta Industries Ltd., 71, Canning Street, Calcutta. Other queries have already been replied to.

56 T. C., Cawnpore. For essential oils, scents, etc. enquire of P. Mukerjee & Co., 29-30, College Street Market, Calcutta.

57 M. V. N., Madura. It will not be profitable for you to import splints and veneers of matches from abroad owing to heavy import duty. Splints and veneers may be supplied by Bhawani Engineering & Trading Co., 122-1, Upper Circular Road; Bengal Small Industries Co., 91, Durgacharan Mitter Street and Sundarban Match Works, 12, Dalhousie Square; all of Calcutta.

61 C. V., Jhansi. How is it possible to go to England without any cost unless you secure some scholarship? Tea may be had of Bhattacharjee & Co. Ltd., 1, Swallow Lane, and Roy Brothers, 17, Raja Bagan Junction both of Calcutta. Carpenters' tools may be had of E. A. Currim, 17, Apollo Street, Fort, Bombay.

62 R. N. M., Bhatryari. Please apply the colour after burning the vessel.

65 K. R. N., Tirumangalari, For comb making machine please enquire of Oriental Machinery Supplying Agency Ltd., 20-1, Lal Bazar Street, Calcutta. We do not know what is Kochai powder. You may consult Mr. J. C. Ghosh of Calcutta Technological School, 30-2-4, Doctor Lane Cal., for chemical analysis.

66 R. K. C., Bellary. Marble stones may be supplied by Upper India Stone Co., Chunar, and Banerjee Bros., 4, Bentick Street, Calcutta.

67 C. S., Jalgaon. Coaltar cannot be deodorised. A good drier for paints is made by grinding or dissolving a small quantity of sugar of lead in linseed oil. Your enquiry regarding distemper will appear in Formula section

Limitation of Family.
an Enlarged Ed. Profusely Illustrated 46 Engravings **424 pages price Rs 3 post Extra**
A comprehensive and Confidential Treatise. Every parent desiring to regulate the number of children according to his health 'and means' will find it a god-send, ask for table of detailed contents which will be sent free K M. DASL & CO
29-1, Telepara, Sampooker St., Calcutta.'

68 T. V., Masulipatam, Your query is unintelligible.

70 N. M. J., Cambay. For basket making etc. you should read some books that may be supplied by Messrs Chakravartty Chatterjee & Co., Ltd., 15, College Square, Calcutta. If you wash woollen and silk cloth with ordinary washing soap your cloths will be impaired. In removing ink stains from linen lemon juice will often prove efficacious. If this fails you may apply the following process : Apply tallow to the inkspot and then wash in a solution of pyrophosphate of soda until both tallow and ink have disappeared.

71 J. N. O, Rawalpindi. Electrical engineering is taught in Bengal Technical Institute. Panchavati Villa, Manicktola, Calcutta and Bengal Engineering College Shibpur, Howrah.

72 P. N. S., Chicacote. For bamboo penholders enquire of The Ryoyeen Shokai, Chayamachi, Okayameken, Japan.

73 G. N., Lahore. Formula of a good hair dye appeared in September, 1922 issue of INDUSTRY,

75 D. B. C., Brahmanbaria. The address of Messrs K. H. Kahbur & Co., is 95, Clive Street, Calcutta. Colours you require may be had of Messrs Amirchand Mehra & Sons, 44, Armenian Street, Calcutta.

77 Roll 17391, Indore, Recipe of blue black ink appeared in June 1923 issue.

78. S M. P, Tinnevelly. No such firm is known to us.

79 R. D. K. S, Etah. Soda water machine may be bought of Little & Co, 3 Grant's Lane, Off Lal Bazar, Calcutta.

83 D. T. C., Dacca. Can supply otter's skin.

85 K. C. T. C. J., Rohri. The Monochrome Photo Co., 6, Snow Hill, Holborn Viaduct, London E. C. 1, may undertake enlarging your photos. You may open an art studio.

86 F. A., Quitta. Before picking and cleaning dried fruit please wash your hands and make them disinfected. To spread your business advertise in some daily papers. An article on packing fresh fruits will appear in an early issue.

88 M. S. K. K., Murree. Brushes may be had of Messrs Bonner & Co., 209, Cornwallis Street, Calcutta and Brushware Ltd , 123/1, Halsey Road, Cawnpur.

89 M. P., Jaipur City. Electrical goods may be had of Deva Datta Saraoge & Son, 13, Pollock Street and Babmer Lawrie & Co., 103, Clive Street both of Calcutta. An article on electric battery appeared in the last March issue.

90 A. K , Kandy. Wants to know the address of Universal Capital Co.

91 D. G. N., Villupuram. To start a match factory on a large scale seek the advice of Mr. A. P. Ghosh P. O. Box 868, Calcutta.

92 Roll 16844, Cuttack Formula of toilet soap appeared in June 1921 issue of INDUSTRY. Nigrosine 2 parts, sugar 2 parts ; dextrine, 1 part. Mix and put up into packets. Two parts of this powder are to be dissolved in 80 parts of water for black writing ink. Nigrosine should be water soluble.

93 K. P. F , Vellore. A formula of cementing iron will appear in an early issue of INDUSTRY. For particulars of the joint stock company please enquire of Registrar, Joint-stock Companies, Government Place, Calcutta.

94 B. P. Patna. Rubber may be had of S. Zahid & Co., Arrah ; Duncan

KAMINIA OIL.

(REGISTERED).

Used by all nations for preserving and beautifying the hair & keeping the head cool and brain refreshed. Rs. 1-4 per bottle.

Try It Once.

Sold Every Where.

Bros., 101, Clive Street, Calcutta and Bhoot Nath Mukerjee & Co., 12, Raja Woodmunt Street, Calcutta.

97 P. S. J. C., Agra. White oil is mostly used as basic oil for hair oils. Process of refilling dry batteries appeared in June 1923 issue.

99 M. J., Amritsar. Your query is outside the scope of Industry.

100 H. C. C., Rawalpindi. We do not stock any article. You better write direct to the advertiser.

101 M. L. D., no address. The recipe of the martin gas in question is not known to us. We are on the look-out for the same and shall publish it in the paper as soon as available. Use the hydrochlorate as directed in the recipe.

103 M. A., Peshawar. Of course there are openings for a Matriculate for engineering training. You may join Dacca Engineering College, Dacca; Sibpur Engineering College, Sibpur, Howrah; Bengal Technical Institute, Panchvati Villa, Manicktala, Calcutta, Government School of Engineering, Lahore.

106 C. A. B., Nagpur. For pipe-clay you are referred to Calcutta Mineral Supply Co., 31, Jackson Lane, Calcutta. The process of obtaining pure coconut oil appeared in October, 1921 issue. Care should be taken at the time of milling. We know of no text books on the preparation of hair oils. You may however refer to April, 1923 issue of Industry.

107 N. N. G., Gauhati. For brass sheet manufacturing machines you are referred to Alfred Herbert, 13 British Indian Street, Calcutta.

108 J. A. M. P., Jugsalai. The vernacular equivalents of Cocculus Indicus are as follow: the cochineal insect; kirmdana, kirmaz, kiranda and kirm.

109 P. M. N., Ahmedabad. The amount of capital to be invested depends upon the scale you commence business. A capital of about 1 lakh of rupees is needed to start a cinema business. Films, etc. may be had of the Pathe Cinema Ltd., Pathe Bldgs., Ballard Estate, Bombay. You may also hire the films from big cinema companies for show. Books on the subject may be had of Messrs Chakraverty Chatterjee & Co., 15, College Square, Calcutta.

111 C. P. A. M., Annur. Cinema machines may be bought of Messrs J. F. Madan & Co., 5 Dharrumtola Street, Calcutta. See 110. For Antimony and platinum you may enquire of Scientific Supplies (Bengal) Co., 29 & 30, College Street Market, Calcutta.

113 K. V., Hindupur. Wants to be put in touch with sweetmeat manufacturers of India and abroad. For sugar machines and estimates write to Messrs Duncan Bros., 101, Clive Street, Calcutta.

114 I. L. P., Santa Cruz. To drive away mosquitoes sprinkle a small quantity of pennyroyal around the room.

115 M. A. K., Nander. You have first of all to learn the art of photography. For detailed information on the subject you are referred to standard works on Photography to be purchased of Kamala Book Depot, 15, College Square, Calcutta.

117 J. B., Entally. For suitable papers for envelopes you may write to Messrs Purna Chandra Kundu, 139, Old China Bazar Street, Calcutta. It is impossible to quote the names and addresses of all firms of Calcutta. You may consult Thacker's Directory where you will get the addresses of the merchant houses of the principal towns of India. Thread may be bought of East

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Pile specific Re. 1-4, Pile Ointment Re. 1 Laxative Conserve Re. 1 and Tonic of Lile for stopping hoemorrhages Rs. 3-8 (Post and Packing extra) One out of thousands of unsolicited testimonials is given below:—

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D. B. MOTIWALA & SON,
Morland Road, Byculla, Bombay.

and West Trading Co., 16, Bonfield's Lane, Calcutta.

118 T. A. G., Poonthurai. Enquires if any expert could invent a small handy machine for making fishing nets with cotton threads, the holes being diamond pattern size varying from ¼ inch to larger, according to the size of the mesh.

119 V. J. H., Jamnagar. There is no such paper nor can it be so.

120 S. L. & Sons, Agra. Sandalwood oil may be had of Mysore Agency, 39/6, Sukea Street, Calcutta. Groundnut oil is supplied by Sabapathy Pillay, T. S. & Co., 70 Somipillai Street, Choolai, Madras.

122 T. & H. C. Bros, Sukkur Sind. Tyres in India are manufactured at Diex Aye Rubber Factory at Tollygunj of which Messrs N. K. Mitter & Co, 289, Bow Brzar Street, Calcutta are the managing agents. Clocks are not made in India.

123 M. N. S. K, Udipi. The finish of matches depends wholly on the care and workmanship employed in production. The machines you refer to have under proper guidance been seen to produce very good quality of matches. A series of articles on 'sugar appeared in the 11th and 12th volumes of INDUSTRY.

124 M. & Co., Amritsar. For Homeopathic pharmacy in France please write L' Association National d' Expansion Economique 23, Avenue de Messine, Paris (8e.)

125 N. H. K., Kalpapur. To remove the bad smell of dikemali, a gum resin of a yellowish green colour, without losing its medicinal properties is impossible.

130 P. V. S. L. & Co., Madras. Tin cases are manufactured by Bengal Box Manufacturing Co., Raja Naba Kissen Street, Calcutta; Calcutta Tin Printing and Hollow-wares Ltd., 133, Belliaghata Road, Calcutta; and Cawnpur Hollow-wares Ltd, La Touche Rd., Cawnpur. Also desires to be introduced to manufacturers of same in Madras.

131 G. H. R., Shahpur. You may distinguish artificial musk from real one by its characteristic odour and stimulating property.

132 A. H. K., Delhi. For Japanese match parts write to Messrs. B. M. Start & Co., 133, Canning Street, Calcutta.

133 H. G. S., Beltangady. There is no institution where lozenges making is taught.

134 R. B. L., Pilibhit. Photo goods are available of: (1) Theodar Teichgrauber Akt-Ges, Berlin S. 59; (2) Hans Helle, G. m. b. H. Erfurt 25, (3) Ed. Tschan, Gerhofstrasse 3-5, Hamburg 36; all of Germany. The address of the smallest camera maker is not known. The addresses of trade journals have appeared in the previous issues of INDUSTRY. The photographic journals are: (1) Amateur Photographer and Photography, 20, Tudor Street London, E. C. 4; (2) British Journal of Photography, 24, Wellington Street, Strand, London, W. C. 29. (3) Photographic Dealer, Sicilian House, Southampton Row, London, W. C. 1. The address of Messrs. Philip & Co. is Amherst Street, Calcutta. No medicine is known which permanently removes hair.

135 V. D. G., Akola. The analysis of Mohuwa Oil will be published in an early issue. Soap stamping machines may be had of (1) Calcutta Industries Ltd 72 Canning St, Calcutta. C. S. Sarkar, 86/1 Narkeldanga North Road. An

Bombay Deshi Oushadhalaya.
Factory and Dispensary.
ASK FOR ANY FEVER
AGUE KILLER.
1 Phial As. 8. Dozen Rs. 5.
and our other popular remedies Can be had everywhere at Cheapest Rate
PEARL & CO.,
Victoria Garden, Bombay.

article on silvering appears elsewhere. The formula for good bar soap appeared in August 1922.

136 R. S. B. S., Balia. See no. 114. We know of no such firm who could agree to your proposals.

137 P. Z., Maungolow. Use polishing lathes, to give polish to the bangles. Skins such as those of deer, tiger, etc can be preserved with the hair on. An article on taxidermy will appear in an early issue of INDUSTRY.

140 M. S, Rangoon. For particulars about tea and place of production you are referred to the June, 1923 issue of COMMERCIAL INDIA. Tea may be had of : Bhattacharya & Co., 1, Swallow Lane, Imperial Tea Supply Co., 3-1, Mango Lane ; all of Calcutta.

142 K. N., Nellore. Halftone blocks are made to order by Mahila Process and Engraving Works, Pataldanga Street, Calcutta and Bharatbarsa Halftone Works, Cornwallis Street, Calcutta.

143 S. K. V. M., Amod. Wants to dispose of lots of waste tin. The ivory waste can be softened and re-used, for which consult the May, 1923 issue of INDUSTRY.

144 S. H., Coimbatore. Cobblers' tools are supplied by N. G. Mitra & Co. 135, Chandney Chowck, Calcutta.

145 T. A., Sattenapalli. A process of silvering mirror appears elsewhere.

146 P. N. S., Madura. For details of ice making plants write to Messrs. Burn & Co., 7, Hastings St., Calcutta.

147 F., Dhar. Stag horns may be had of Calcutta Armoury Co., 1, Chowringhee Road, Calcutta and ivory of Durgadas Radharam, 20, Church Gate Street, Fort, Bombay.

WEIGH YOURSELF

After using **Amrita Kunda Salsa with Gold** for only 2 weeks, you will find that your weight has much increased. It **Purifies the blood**, and increases and strengthens the growth of blood by creating blood corpuscle. It destroys the **mercurial & syphilitic poison**, Price 1 phial Re. 1. Postage 8 as. 3 phial Rs. 2-8, Postage 15 as. Catalogue free on application.

KAVIRAJ DASHAROTHY KAVIRATNA
Dawn Lane, Hatkhola Post, Calcutta.

148 A. M., Bandra. Process of making vegetable butter will be found in the November, 1922 issue of INDUSTRY.

149 C. Co., Madras. Please write direct to the party by number under care of INDUSTRY.

150 K. V. S. V., Tinnevelly. For tobacco preparation, you are referred to the July 1920 issue of INDUSTRY. For distilling apparatus write to Bengal Chemical & Pharmaceutical Co., 15, College Square, Calcutta.

151 G. D. R., Narsingpur. We know of no institution where block engraving is taught, you shall have to learn the art by serving apprentice to engravers artisans themselves.

152 D. B, Lucknow. You are referred to Kelly's Directory of the World for a list of manufacturers of all kinds of machines. We would try to quote you particular names when we learn in which machineries you are especially interested.

155 S. M. S., Mettarpalaiyam. You may correspond with the tea merchants of the towns. You may also take recourse to regular advertisement to speed up your sales.

159 B. S. M. B., Bombay. The effect of hair dyes are not permanent nor are the solutions stable in the sense you use the word.

160 S. P. & Co., Sthal. Wants to be introduced to the dyers of various fast colours.

161 N. L. D. & Co., Dacca. Gummed envelopes are dried by passing them over a heated plate, What do you mean by tin paper weights ?

162 A. S., Meerut. Imitation jewelleries may be had of A. Bakardas & Co., Alipada Street, Cambay, Bombay

163 N. & P., Saugor. Picture frames are to be had of Messrs Bennet and Jennison Ltd., Grimsfy, England.

164 S. B. S. M. & Sons., Rotak. For reel making machine, enquire of Messrs Bros. Partner & Co., 35, Ezra Street, Calcutta. Cotton threads for thread balling purposes may be had of The East and West Trading Co., 16, Bonfields Lane, Calcutta.

165 H. L. R., Bagepalli Your query has already been answered under 3128 in the March 1924 issue.

166 N. H. O., Jharsaguda. The association you refer is the Association for the Advancement of Scientific and Industrial Education of of Indians, 10, Old Post Office Street, Calcutta. You may invest your money as fixed deposit for a long term in a good bank.

167 K., Ahmedabad. The Himalayan Stores, Kasauli can supply you with pure musk.

168 D., Amritsar. Rubber stamp outfits may be purchased of Mr. B. N. Basak, 1-1, Ramchand Ghosh Lane, Calcutta. Rubber baloons are to be had of Ali Mohamed Akber Ali, 22-1, Lower Chitpur Road, Calcutta. Rubber stamp pads are stocked by J. Callarman, 25, Mango Lane, Calcutta. Rubber sheets may be had of Duncan Bros., 101, Clive Street and Balmer Lawrie & Co., 103, Clive Street ; both of Calcutta.

169 W. W. M., Rawalpindi. Magnifying glasses, etc. may be bought of Messrs. Adair Dutt & Co, 22 Canning Street, Calcutta.

170 A. R. K., Chanda. Hydrogen gas is prepared by the action of sulphuric acid on zinc. See No. 252.

171 K. S. L., Dharwal. To secure agency of firms you are to correspond direct with the parties. For names of firms see the advertisement pages of this Journal.

175 K. L. M., & Co., Ahmedabad. Pure musk is to be had of The Himalayan Stores, Kasauli ; Mohandas Lakshmidas, Nepali 96, Harrison Road, Calcutta ; C. Mitter & Co., 28, Lower Chitpur Road, Calcutta.

179 J. C. M., Raghunathpur. Catechu is required in every Indian household for the preparation of betels. It has got also a large use as a useful tannin material. The spice merchants of Calcutta may buy your catechu and you may communicate with them. The current market price varies between Rs. 30 and Rs. 35 per md.

177 S. P. G. Lahore. To have an idea of the London Money Market you may read London Money Market by Spalding. You may also refer your queries to COMMERCIAL INDIA. You may go through well-known manuals on agricultures, dairy products, etc. to be had of Messrs. Chakraverty Chatterjee & Co., 15, College Square, Calcutta.

180 N. G., Bhawanipur. Foreign capitalists can purchase immovable properties in India. Wants to be introduced to big financiers, both Indian and foreigner, willing to invest large amounts of loans on security of immovable properties in British India.

181 P. P. T., Nagercoil. For the books you name and their prices write to Messrs S. C. Auddy & Co, Wellington Street, Calcutta.

188 N. & Co, Bangalore. The list of chemical manufacturers in question appeared in the July issue of 1923. Asbestos sheets are available of F. Muraglia & Co., 14, Fort Street, Bombay and Asbestos and Belting Co. Ltd., 7, Council House Street, Calcutta.

189 P. K. & Co., Agra. Mahua oil may be obtained from Hajarimal Ram Chandra, Giridih, and cotton seed oil from Indian Cotton Oil Co., Navsari, Hummum Street, Fort Bombay. Soap colours appeared in the issue of August, 1922, hints on soap making in July 1923. Caustic soda may be had of the Calcutta Chemical Co., 5 Bonfield's Lane, Calcutta.

190 C. H. R. & Sons, Vizagapatam. Mirror glass may be purchased of Beharilal De, Swallow Lane, Calcutta.

The Ideal Cooker
FOR THE HOME.
New manufactures cheaper prices & larger output are our aims Illustrated Catalog free—
Annapurna Cooker Co.
No. 1 A. P. O. Thalakwadi.
Belgaum. M.S.M. Ry.

192 N. B. K., Dharwar. You may go through soap making by Alexander Watt.

193 P. S. B., Gowja Jali. Castor seed is available of Anderson Wright & Co., 22, Strand Road, Calcutta; Best & Co., North Beach Road, Madras; Bangshidhar Shankerlal, Cawnpur.

196 T. V, Masulipatam. Khaddar cloth may be had of Khaddar Prochar Samity, 17-2, Harrison Road, Calcutta. Calcutta Khaddar Bhandar, 5, Harrison Road, Calcutta. For a list of merchants you may go through our Exhibition Specials which appeared in December, 1923 and January, 1924 issues of INDUSTRY. The gunny mills are: Kamarhatty Jute Mills, Kamarhatty; Alliance Jute Mills, Shamnagar, 24 Parganas; Albion Jute Mills Co., Budge Budge.

197 B. S. R., Madras. It is difficult to suggest improvements unless we know your method of working.

198 M. L., Hathras. You may communicate with Bhagataram Sheopratab, 99-3, Armenian Street, Calcutta for saltpetre.

201 J. P. R., Lahore. Resin may be had of Jallo Rosin & Turpentine Factory, The Mall, Lahore.

202 D. D., Sunam. Book binders' materials may be bought of Calcutta Book Binding Materials Trading Co., 68, Boitakhana Road, Calcutta.

203 D. P. V., Lahore. Wants to know what Reset is.

204 K. G., Tikamgarh. For imitation gold write to the advertiser. For corkwood enquire of P. S. Dutt & Bros. 8, Ezra Street, Calcutta. For imitation pearl enquire of Binode Bihary Dutt, Lal Bazar, Calcutta.

205 S. G. S., Hamidpur. If you wish to start your factory on a small scale the chopping system machine will do. While on the other hand if you intend to drive your machine by power the peeling system machine will be suitable.

207 T. B., Ahmedpore. Can supply soap material.

208 H. S. R., Bagepalli. Cigarette machine may be supplied by United Cigarette Machine Co., 5, Holborn Viaduct, London. You will have to prepare cigarette boxes locally per order. Guns, etc. may be had of Messrs K. C. Biswas & Co., 1, Chowringee Road and D. N. Biswas & Co. 5, Dalhousie Square East; both of Calcutta. Rice may be supplied by Babar & Co, Mg. Taulay Street and Arracan Co. Ltd., Phyare Street, both of Rangoon. Formula of ink powder appears elsewhere in these columns of the current issue.

210 J. N. C., Rawalpindi. For studying electrical engineering you may write to the Principal, The Old Victoria Jubilee Technical Institute, Bombay.

212 D. R. K. C, Colombo. For accessories of match machine please enquire of Messrs Ghatak & Co., Rai Bahadur Road, Behala, Bhawani Engineering & Trading Co., 122-1, Upper Circular Road and Bengal Small Industries Co, 91 Durga Charan Mitter Street; all of Calcutta. Chemicals may be bought of Calcutta Chemical Co, 5 Bonfield's Lane and Oriental Industrial Co, 9, Bonfield's Lane; both of Calcutta.

215 S. N. G, Monghyr. Thread may be supplied by J. and P. Coats Inc, Pamtuckat, Rhodes Island and Dean and Sherk Corp, Detroit, Michigan; both of U. S. A.

217 M. K., Wynaad. No such recipe for curing smoking habit is known. Wall pictures may be had of Indian Art Gallery, 161, Lower Chitpur Road, Calcutta.

218 A. G. R., Tatapuram. Cigarettes are mauufactured by British India Tobacco Co. Ltd, 32 Dalhousie Square; Chari & Co. Ltd, 5 Mission Row and Howrah and British Navy Cigarette Co, 100 Cross Street; all of Calcutta.

219 A. W. K. W., Punnalur. Knitting yarn may be had of Messrs E. B. Bros & Co, 11 Dharamtala Street, Calcutta. There is no journal in India dealing with hosiery industry.

220 K. B. D., Miryapur. For the required goods enquire of H. Wilhelm, Schwiecker, Hamburg 36, Germany. Safety matches may be supplied by Y. N. Adachi Kaisha, 43, Nishi-machi, Kobe; The British Trading Co, 15 Genza Nichome, Kyobashi-ku, Tokyo and Chugai Shoko Kabushiki Kaisha, Tosabori, Osaka; all of Japan. Swedish matches may be supplied by The Swedish Match Co, Stockholm, Sweden. For laterns enquire of Inubush Hikida & Co, 12 Sanchome, Yokoyama-cho, Nihonbashi-ku, Tokyo and Kinko & Co, 5 Itchome, Oneyecho, Yokohama; both of Japan.

221 R. H. S., Surat. For papers enquire of Ghose Brothers, 63, J. Radha Bazar Street and Dutt, Mukherjee & Co. 31 Jackson Lane; both of Calcutta.

222 K. P., Kottayam. Harmoniums, etc may be had of Dwarkin & Sons, Dalhousie Square East, Calcutta.

223 D. R. T., Lahore. Soapstone may be had of Messrs. Tularam Nathuram, 86, Harrison Road, Calcutta; Jagadish Agarwala, 26-1 Grey Street, Calcutta and A. N. Bose, Madhupur, E. I. Ry.

224 N. D, Cocanada. Envelope making machine may be had of Calcutta Industries Ltd, 71 Canning Street and Oriental Machinery Supplying Agency Ltd, 20/1 Lal Bazar Street; both of Calcutta.

226 C. S. N., Cuttack. Wants to be put in touch with dealers in hogs and pigs in India.

227 S. K. D, Bareilly. For Scientific America write to Messrs Thacker Spink & Co. Esplanade East, Calcutta.

228 S. L. D, Jalalabad. For drawing water from a well you may use water lift which may be had of Messrs Burn & Co, 7 Hastings Street, Calcutta.

229 S. P. M, Ahmednagar. Formula of dyeing cotton fabrics with chrome colours will appear in an early issue of INDUSTRY.

230 D. N. S, Delhi. The London Waste Paper Co. Ltd, King's Arms Wharf, London S. E. 1 and W. V. Bawater Sons Ltd, 159 Queen Victoria Street, London, S. E.

231 M. C, Hinganghat. Sewing machines may be supplied by H, Ahler & Berg G. m. b. H, Kiel, Germany.

232 J. V. R, Alleppey. Cane is generally pliable hence no equipment is necessary for bending canes as desired.

235 V. S. R, Bellary. For starting business with small capital please go through New Idea columns of INDUSTRY. For small machines enquire of Oriental Machinery Supplying Agency Ltd, 20-1 Lal Bazar Street, Calcutta.

238 S. H. L, Campbellpur. Detailed information regarding Burma will appear in an early issue of INDUSTRY.

239 B. L. M. B, Barpara. Your queries appeared in the last March issue.

240 R. N. D., Sutna. Wants to be put in touch with dealers in Indian Rooh, essences of Grape, Sandal, Lichi, etc.

241 M. B. H., Darbhanga. Desires to be introduced to dealers in chillies and tobacco of Madras, Ceylon, Delhi, Cochin and Karachi. For motor lorries enquire of French Motor Car Co. Ltd., 43-3, Lower Circular Road, Calcutta.

242 T. C., Sialkot City. Envelopes are manufactured by N. L. Dutt & Co., 26, Bangala Bazar, Dacca.

245 Q. N. H., Palamou. Can supply myrobalans, ghee, kath, etc.

246 K. R., Vizianagram. For extracting plantain fibre you may consult. Hand Book of Plantain Fibre and Fruit Industry by Mr. J. K. Sarkar, to be had

Ladies

willing to obtain a beautiful complexion should have my true secret, the Beautifier (worth Rs 5) the greatest aid to beauty, for two annas stamps only.

GHULAM ALI, Kalasan,
P. O CHAK, 32/2L,
Dt. Montgomery, (Punjab.)

of the author at Sukchar, Bengal. For expert advice also you may write to the author of the book. For machines required enquire of Earnest Lehman, Manchester, England. Union Agency, Nava Bazar, Margao, Goa, may purchase plantain fibre.

247 P. R., Jhelum. To sell the articles manufactured by you advertise widely.

248 L. S M., Akola. For particulars regarding ice making machine write to Messrs Burn & Co, 7, Hastings Street, Calcutta. There are many ice factories and aerated water manufacturers in India. Hence it is not possible to publish their addresses in these columns ; you better consult' directory. Aerated water is manufactured by Byron & Co , 4, Chowringeee Road, Calcutta ; Vithaldas Karsondas, 364, Upper Duncan Road, Bombay ; Fenton & Co., Bunder Road, Karachi and Jharris & Co., Pophauis Broadway, Madras.

250 G. A., Jullundhur. An article on stamp collecting will appear in an early issue.

251 D. P. K., No addess. Formula of syrup powder appeared in the last February issue of INDUSTRY. Distilled water is procured in distilling ordinary water. The process is very simple and will be found in any book on chemistry.

252 A. R. K. Co., Chanda. As hydrogen is comparatively little employed on large scale, it is scarcely an object of manufacture. The reaction most suitable for manufacturing purposes is that in which steam is passed over red-hot iron. The materials are of great cheapness and the chemical change is of simple character.

253 J. M. T., Kankanady. You are to use pigments for colouring cements. For pigments enquire at any paint shop.

254 T. S. R., Rajahmundry. To start business with small capital please go through the New Idea columns of INDUSTRY.

255 E. M. T., Bhalani. For ice machine you may write to Messrs Burn & Co., 7, Hastings Street, Calcuta. An article on canning appears elsewhere in the current issue.

256 K. A. P., Tuticorin. To correspond with any querist please write him with number and initials under care of INDUSTRY when your letters will be duly redirected.

258 K. P. V. C., Lahore. Ink tablets may be had of Bengal Ink Factory, 49-1B, Raj Ballav Street ; Sulav Ink Factory, 136, Upper Chitpur Road and Bagh Bazar Ink Factory 14, Lakshmi Dutt Lane ; all of Calcutta. For other addresses refer to No. 1.

262 V. S. J , Pamidi. Sewing thread may be had of Advance Trading Co. 14, Medows Street, Bombay. For thread balling machine enquire of Imperial Machine Co., Near Parsi Statue, Bellasis Road, Byculla, Bombay; F. Ruttan Shaw & Co., Oak Lane, Esplanade Road, Bombay.

264 R. T. K. S., Karki. The apparatus for extracting essences etc, may be supplied by Bengal Scientific Supplies Co. 29 & 30, College Street Market, Calcutta.

267 B. N. D. C., Gauhati. A recipe of good furniture polish appeared in February, 1923 issue of INDUSTRY.

268 P. K., Dhamtari. Machine dealers will teach the method of working the machine. To communicate with any querist address him by number and initials under care of INDUSTRY when your letters will be duly redirected.

272 C. S. C., Jalaun. Sugar making is taught at Andubon Sugar School, Lousiana, U. S. A. Leather industry is taught at Northampton and Country Technical Institute, Northampton, England.

273 B. D U., Gudivada. Regular reading of newspaper will do much towards the improvement of your knowledge in English literature. For Indian Gazette apply to the Superintendent of Government Printing, 6, Hastings St., Calcutta.

274 V. D., Salkia. Hellebore black is Kala-Kutki in Bengali. This is a small perennial herb, with black, jointed, definite rhizomes having numerous interlacing rootlets. It is a native of Central and South Europe, extending eastwards to South Poland and westwards to Dauphiny and Provence. Some also say that the drug is met with in Nepal.

276 C. R. M, Bangalore. The book referred to by you may serve your purpose.

277 K. N. R., Bijapur. An article on Calico Printing appeared in December 1922 issue where you will find detailed information regarding printing on cloths. For dyeing with indigenous products you may consult Deshi Rang by Sir P. C. Roy to be had of Book Co., 4-4A, College Square, Calcutta.

278 R. C., Patna. You add some thickening agent to rubber stamp ink and make it of required consistence. Messrs Abdul Khaliq & Co., 11, Colootola Street ; S. Ehran Elahi & Sons., 75-2, Colootola Street and M. B. Mirza & Co., Siraj Bldg., Colootola, all of Calcutta, deal in imported hosiery goods.

279 V. B. C., Lakhimpore. For mould for toys enquire of Messrs. Prabhoo Lal Bros., 4883, Sadar Bazar Street, Ambala Cantt.

280 M. J. A., Alleppey. Homoepathy is taught at The Chicago College of Homoepathy, 89, Shambazar Street, Calcutta. For an exhaustive list please consult a directory. Homeopathic medicine may be had of Messrs. N. K. Mazumdar & Co., 34, Clive Street and Butto Kristo Paul & Co., 92, Shova Bazar Street, both of Calcutta.

281 B. S. M. C., Belgaum. For gas lamp mantle knitting machine enquire of Oriental Machinery Supplying Agency Ltd, 20-1, Lal Bazar Street, Calcutta. The required chemicals may be bought of Messrs Butto Kristo Paul & Co., 1 & 3, Bonfield's Lane, Calcutta.

284 A. D. V., Ambala. Bucket making machinery may be supplied by Daniel Smith Ltd., Castle Iron Works, Peel Street, Wolverhampton, England and Taylor & Challen Press, Birmingham, England.

287 B. P. S., Samyagarh. We do not deal in any article ; we only furnish information to our constituents. Pulse making machines may be bought of Oriental Machinery Supplying Agency Ltd., 20-1, Lal Bazar Street, Calcutta and Ghatak & Co., Rai Bahadur Road, Behala, S. Calcutta.

288 S. M. K. E. C., Meerut. You may consult Business Directory of India, Burma and Ceylon, published by the Kanara Press, Madras beside Thacker's Directory.

289 K. S., Kandy. Gum bottles may be had of J. S. Nigaw & Co, 395, Katra, Allahabad ; Parbhoo Lall & Bros, Sadar Bazar, Ambala, and United Provinces Glass Works, Bijhoi Dist, Moradabad. For Japan make bottles enquire of Kasai Brothers & Co, 2 Chome Sannomiva-cho, Kobe, and Miznochi & Co , 75, Nichome, Kita Kyuhoji-machi, Higashi-ku, Kyoto ; both of Japan.

290 S. K., Ludhiana. An article on the manufacture of Boot Polish appeared in June 1923 issue of INDUSTRY.

291 N. L. K., Agra. Formula you want will appear in an early issue.

293 V. S. S., Jaipur. Ice making machine may be had of Messrs Burn & Co., 7, Hastings Street, Calcutta. Wants to be put in touch with dealers in katha and turmeric. For other queries advertise in papers.

296 H. C., Karnal. Burning a small quantity of Persian insect powder in a room is said to be efficient in driving away mosquitoes. Process of manufacturing methylated spirit will be dealt with in an early issue of INDUSTRY. For filling holes between teeth seek medical advice.

297 S. D. K., Masulipatam. The following are some of the produce merchants of Melbourne, Australia : (1) Barrow Brothers, 12 to 20, King Street ; (2) J. Cheetham & Son, 533, Spencer Street ; (3) Victoria Butter Factories Co-op Co. Ltd, 47, King Street and (4) Onians Rd & Arthur, 100, King Street. Wants be put in touch with dealers in ghee in Calcutta.

New Prizes for Vol. XV.

The Editor of Industry invites its subscribers to compete for the following prizes offered for the ensuing session.

I. New Ideas for Small Capitalists.

We offer 5 Prizes of Rs. 5 each for ideas which can be successfully adopted by a young man with capital up to Rs. 500 only in his pocket to earn a decent livelihood. Schemes for starting small industries will be welcome but stress will be laid on their practical adaptability which will influence decision.

II. Suggestions for Self-Supporting, Students.

We offer 5 Prizes of Rs. 5 each for suggestions which can be easily carried out by students who follow the principle of earning while learning and which must enable them to defray their expenses at least. The practical nature of the suggestions will be taken into consideration in awarding the Prizes.

III. Occupation for Purdahnasin Ladies.

We offer 5 Prizes of Rs. 5 each for details of useful domestic industries which can be worked by the female members of a family in their spare hours. Special opportunities may be pointed out how a helpless widow can earn a decent living for herself.

IV. Village Manufactures.

We offer 5 Prizes of Rs. 5 each for descriptive notes on the industries of the readers' villages. The narrative should give synopsis of the existing arts and crafts, their past history, present condition, future prospect, raw materials used, working processes, market for products, etc. It should be accompanied by a complete list of names and addresses of persons engaged.

Rules for Competition.

1. Only subscribers to Industry are eligible for the Prizes.

2. The Editor's decision will be final and he will be at liberty to publish any communication in any way he likes. The names of successful candidates will be published in the first issue of the next volume.

3. The Editor will not be responsible for loss of or damage to any correspondence, neither will he remain bound to return any Manuscripts.

4. The Editor cannot enter into any controversy regarding unused or rejected Manuscripts. But in case requisite stamps are enclosed every endeavour will be made to send them back.

5. The Ideas, Suggestions and Articles for the separate sections noted above must be written on one side only on separate sheets of paper and addressed to—

The Competition Editor,
"INDUSTRY"
Shambazar, Calcutta.

Note.

The names of the prize winners in the New Idea Competition for the XIV volume will be announced in the next May issue.

Message of Independence.

Just buy our Knitting Machine worth Rs. 325; work at home and earn independently without risk. We guarantee to buy all finished goods paying ample profit. Prospectus free.

BEHAR KNITTING FACTORY.
PATNA CITY.

NOTICES AND REVIEWS.

Coat Hanger.

The coat hangers manufactured by Messrs K. Sounze & Co., Lahore, are novel, unostentatious and economical, being made of a bit of cane.

Handkerchief.

Nice handkerchiefs printed on sanganeer in fast colour are offered by Messrs Narayan & Company, Maneck Chauk, Near Police, Jaipur City.

Slate Pencil.

We have received a sample cake of depilatory soap and a pair of soft slate pencils from Messrs Gurprashad Jain & Son, Allahabad City.

Iucense Sticks.

The oodabattis (agarbatties) of Ayurvedic, Medical and Perfumery Works, Mysore are made in different kinds, We are extremely pleased with the delicious fragrance diffused by these incense sticks, which fact testifies to their excellent quality.

Po-Ho.

It is claimed that by inhaling this German appliance through the mouth or the nose, one can get rid of cough, cold and headache. It may be had of Messrs N. J. Comrades & Co., Katra Kanhayan, Amritsar.

Lila.Food.

Mr. N. C. Barory, C/o Rajendra Barory, L. M. S., Bagra, Datca, has sent us a packet of the above dietetic for invalids.

Musk-EFF.

An item of interest to the tobacco trade and perfumery business is the Musk-E. F. F. prepared by Messrs D. G. Gore, Savana Bldgs., Lohar St., Bombay. It imparts its sweet aroma to any article which requires to be scented.

Ink-spoon.

The M. M. Inkspoon is an ingenious American device which can be supplied by Messrs Akhtar Bros. & Co, Akhtar Buildings, Sammian St., Lahore. When attached with the nib in the pen-holder it serves the purpose of a simple ink reservoir, constant dipping being thereby avoided.

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Fine Silver Medals in Velvet lined cases
Rs. 3-12 each.
Largest Stock & Variety.
Illustrated Lists Free.
CARR & MAHALANOBIS
CHOWRINGHEE CORNER, CALCUTTA.

Stationery.

Mr. K. L., Kolhatkar of the Krishna Depot, Wai (Satara) has prepared Menthol Cone, Writing ink powder, etc. His Silverine deserves special mention as with its help one can silver looking glasses.

Calendars.

We have received a pair of very beautiful calendars from Mr. Y. Narayan's Typewriter Supply Agency, 364, Esplanade Row, Madras. These bear bedecked facsimile pictures of H. H. the Maharaja and Yuvaraj of Mysore respectively.

Messrs Moced & Bros., 1188, King Kothi Road, Hyderabad, (Dn) have sent us a calendar.

Physical Culture.

The system of physical culture as propounded by Professor A. Rollo of International Health Lodge, Nicholson Road, Lahore possesses some distinctive features. His instructional courses are imbued with almost a personal care for the subject. Those who desire to acquire strength should do well to consult him.

A Chemical Glossary.

Containing Urdu equivalents of English Chemicals. By Mr. Gian Chand Hot Chand, P. O. Bhiria (Sind). Pp. 16, Price As. 9 only.

It will be useful to those who seek vernacular names of technical stuff. But there are some palpable mistakes which ought not to find a place in a book of this nature.

Easy Conversation.

By An Experienced Graduate. Published by Mr. P C. Dutta, Banglabazar, Dacca, Price As. 4 only.

Children can acquire proficiency in colloquial English by exercising with this booklet.

The Spiritual Recorder.

Organ of the All-India Occult House, Dacca.

A magazine devoted to spiritualism, occultism, mysticism, oriental philosphy, the New Thought, etc.

It contains articles on clairvoyance or second sight, science of breath, survival after death, psychic healing, etc.

An Economic Journal.

The Economic Journal of Assam. Published Quarterly. The New Press, Gauhati.

The publication of the Journal has been undertaken with a view to focus the attention of the people to the best methods of utilization of the economic resources of Assam and to study the economic problems confronting her. The object is a laudable one and we wish the Journal godspeed.

Acknowledgments.

(1) The Wonder-Man News 73, Acharappan Street, G. T. Madras.

A Saturday Journal containing much wit, humour, satire, etc.

(2) Indian Trade Review, Post Box No. 1210, Madras. A monthly devoted to all topics of practical interest, industrial matter preponderating.

To Readers of Industry.

Please note that any information in Vegetable Foods, Oils, Soaps, Perfumes and household preparations will be supplied at from 2 annas to Rs. 20 by a 15 years experienced

Industrial Chemist.

No 2, Kanmiannadu Street, Trichy, S. I.

N. B.—Apply for particulars with stamps.

Trade Enquiries.

4 F. B., Secunderabad. Wants to be put in touch with dealers in buffalo horn.

25 S. S., Hardwar. Wants a chemist experienced in match manufacture.

26 M. K. R , Ranchi. Is ready to proceed to England as a representative of some firm for the British Empire Exhibition.

39 A. L , Chaibassa. Can supply whiteclay in large quantities.

56 P. I. Co., Cawnpore. Can supply tin boxes for boot polish and metal polish.

58 P. V. N., Cuddapah. Can supply manganese, barytes and asbestos of superior quality.

76 P. B. L., Cawnpore. Is ready to buy tanned lizard and crocodile skin and myrobalan.

87 W. & Co., Gaya. Desire to be introduced to dealers in myrobalans, nuxvomica, stick lac and costus root.

98 S. & Co., Jhansi. Wants an expert in making black hair dye.

102 N. N., Hindupur. Can supply gall stone in very large quantities.

129 T. V. R. M., Conjeeveram. Wants to be put in touch with lungi dealers of Rangoon.

139 P. B. F. M., Samalkot. Wants an expert in biscuit making.

172 M. A., Triplicane. Wants a soap expert.

174 S. F. & Co., Lyallpur. Wants to be put in touch with dealers in betelnuts at Mangalore, cardamoms at Darjeeling and spices at Calcutta.

178 S. H. L., Campbellpur. Wants to be introduced to dealers in wild gourd.

199 B. M., Rangoon. Can supply graphite, white clay and yellow clay and wants a financier to work up a chromium iron ore mine.

214 B. & Co., Bombay. Want to be put in touch with dealers in araroba.

241 M. B. H., Darbhanga. An energetic youngman wants employment in some business firm.

265 C. I. B., Lahore. An Indian inventor wants a capitalist to help him in his enterprise.

266 H. F. T. Co., Bangalore City, Can supply sandal sticks, sandal wood dust and oil.

282 L. M., Panna State. Can supply teak wood and bamboos.

325 M. C. A., Harda. Wants to be put in touch with dealers in steel slates.

360 A R. V., Khandala. Wants a capitalist with Rs. 1000 to print a beautiful oil painting of Sreekrishna.

363 I. R. S., Amritsar. Desires to be introduced to dealers in khaddar, mother-of-pearl buttons, handkerchief, matting, etc.

365 S. N. S., Calcutta. A match expert with practical experience in a match factory is open to engagement.

May Issue of Industry.

(In the Press)

The May issue of Industry will contain articles on German Silver, Transmutation of Metals etc in addition to the usual features such as New Ideas, Small Trades, Formulas. Any friend of our subscribers may get a copy free as sample on application to the Manager, Industry, Calcutta.

INDUSTRY

Is a monthly Journal of Technology and Handicrafts Science and Commerce. Agriculture and Business. The rate of subscription is as follows :—

Indian Rs. 3. Foreign Rs. 5-4.

The charge is for complete yearly volume only, inclusive of postage.

Single Copy As. 5 only.

BUSINESS NOTICE.

Industry is published at the end of every month.

Subscribers are enlisted at any time of the year but they will receive only the number from April to March comprising a complete volume for one year's subscription.

At the time of sending a V.P.P. only the current number is generally sent. The previous issues of the volume are sent per book-post on receipt of the value of the V.P.P. . For particulars and Advt. rate please write to—

Manager, INDUSTRY OFFICE,
Shambazar, Calcutta.

Managing Editor—Mr. K. M. Banerjee.

INDUSTRY

A Journal of Technology Handicrafts & Commerce

Vol. XV. Calcutta, May, 1924 No. 170

The Career Gate.

STANDING on the threshold of his career the Indian Youth of to-day is at a loss to choose the avocation most suited to him. He finds all the stereotyped walks of life blocked. We allude to the clerical, legal and medical professions. There appears to be yet some scope in the engineering line—civil, mechanical and specially electrical. But in the general line there is absolutely no room for headway. And if he has prepared himself to that end, oftner than not he discovers with dismay that the expenses he incurred for his too literary education have not been a safe investment but a total loss and the years he has passed in the college, a mere waste of time.

The guardians have also to bear a share of responsibility in this respect. They scarcely take trouble to consult the liking or disliking of their wards to any avocation, they neglect to study their inclination or temperament. Thus it is that we so often come across persons whose lives are failures—physicians who would have shined better as lawyers, a clerk who would have succeeded as an engineer and so on. These human wastes are due to errors of judgment on the part of those who sought to pilot their careers in their early days.

It is, therefore, no easy matter to lay down a course for youthful readers of INDUSTRY. So much depends upon individual proclivities, physical development, intellectual training, even moral culture as to make it hazardous to lay down any general principles. Suffice it to point out that the only possible course is to divert the activities of the future generation to agricultural, industrial and commercial channels. Our Agriculture has been hitherto awfully neglected. With the growth of population more stress should be laid on food production. The methods of cultivation now followed are primitive, there is a vast scope for improvement. More and more scientific knowledge should be utilised for intensive farming, and extensive cultivation. It can be proved with the help of statistics that whereas the population is steadily increasing, the yield of food staples is gradually decreasing. This state of affairs should be specially remedied if we are to prevent famine conditions.

Then India is witnessing the dawn of an industrial era. The time is extremely opportune for starting various industries. Indian capitalists are liberally investing in industrial ventures, there is no dearth of trained experts to take charge of them ; India abounds in raw materials of every description ; the public are prone to patronise country made products. A great deal of success is thus assured to Swadeshi enterprises. The conditions are thus favourable for their nurture and growth. Only pioneers are needed to give them a start.

Again, with the spread of education amongst all classes and with increase in the standard of living of the people the articles of consumption are increasing by leaps and bounds. The demands of the consumers have increased enormously. With cheap transport facilities and net-work of communications the volume of trade and commerce is daily growing. On the one hand, the raw materials of the interior parts can be easily brought to the industrial centres and on the other all sorts of merchandise can be reached there from the trade entrepots.

Thus fresh openings must be sought for in the domains of both production and distribution. Taking it to be our duty to chalk out fresh avennes of employment for our youngmen we have endeavoured to diagnose the economic situation of the country. We have been consistently exploring possibilities and offering practical suggestions. It remains for our hero to decide his own course : we can only lead him to his Career Gate with the inspiration "Knock ye and it shall be opened unto you."

Photosculpture.

PHOTOSCULPTURE is a newly discovered process by means of which faithful and accurate reproductions may be executed either in relief or intaglio, of any object that comes within a sculptor's range of work. Such reproductions can be worked in any required material, e. g., wood, ivory, marble, metal, etc. The system has been evolved by Mr. H. M. Edmunds of England and depends for its achievements on an ingenious combination of magic lantern, camera and carving machine. The following description of method has been furnished by its promulgator. "In a dark room, light from a magic lantern is projected on to the face of the subject through a screen of glass upon which is a series of lines in a spiral form something like a gramophone record. These lines, falling on a plane surface, would show as a uniform spiral but when projected on to a human face, for example, they become irregular and distorted. A photographic camera at the same time receives on its sensitive plate the object before it, with all its distorted lines. This plate is fixed and developed, thus furnishing the 'record' which is afterwards employed in the carving machine, enabling the operator, by carefully following these lines, to control a revolving cutter, or drill, which effects a cut of varying depth in the material upon which it is acting, and thus produces a solid copy in the three dimensions—length, breadth and height of the subject upon which the lantern has thrown its rays."

INDIA'S INDUSTRIAL PROGRESS.

Small Industries in Madras.

It was on the initiative of Sir Frederick Nickolson that the Minor Industries Laboratory of the Government of India was started in September, 1919 at Coonoor. As a result of its useful activities a canning works has been successfully established at that place a report of which appeared in an early issue. The ink factory started by it was later on transferred to Madras where it is now engaged in manufacturing inks of different grades and varieties including stylographic inks, stamping inks for registration, indelible ink for cheque writing, etc all of superior quality. It would thus appear that the fundamental objects of the Institute has been realised, namely, to make use of indigenous materials, labour and skill for the inauguration of useful though minor industries and to set up standards of the quality for the various products of manufacture.

Industries of Burma.

The great bulk of the indigenous population of Burma is agricultural. The principal industries are rice-milling, petroleum winning and refining, saw-milling and the transport industries. The number of employees in the first named of these forms about 40 per cent. of the whole industrial population. The most important cottage industry is weaving, both silk and cotton, which by the introduction or extension of co-operative methods, made some progress towards becoming an organised industry. Improvement has been effected by the training of a number of weavers from various parts of the province at the Saunders Weaving Institute, Amarapura. Pottery also provides employment for considerable numbers in various localities.

Natural Wealth of Travancore.

The potentialities of Travancore as regards her water, mineral and forest resources offer unlimited scope for enterprise. Besides she possesses, in an abundant measure, all the natural agents so eminently conducive to her industrial advancement.

There are in the State more than 150 factories worked by all forms of power, and there is also ample scope for the promotion of industries, especially in view of the inexhaustible wealth of raw products. The suggestion made everywhere is that its water-power could be turned to the best advantage of the State.

There is ample scope for the conversion of the hydro-electric energy into a form for use in industrial expansion. Sufficient electricity could be generated to be utilised for light, for the manufacture of coconut produce such as margarine and the extraction of oils, and in the allied soap industry. Another direction in which it could be used is in the extraction of nitrates from the atmosphere whereby manures can be easily obtained at cheap rates. Travancore is a purely agricultural country where the use of chemical and scientific manures to crops has been largely appreciated by the ryot population, and the value and need for intensive cultivation have been recognised.

The preliminary conditions for working hydro-electric schemes in the State are all present in Travancore. There is a heavy rainfall, big waterfall in association with a small flow of water, or large river discharges with a moderate fall. Several of the mountain streams in the interior and hilly parts satisfy one or other of these conditions.

Drug Possibilities of India.

In the opinion of Professor H. G. Greenish, probably the world's preeminent authority on pharmacognosy and all that pertains to the cultivation of drugs, India is in a position to produce successfully every variety of medicinal herb owing to the remarkable variations she possesses in respect of climate, altitude and soil. It is not often realized, he says, how largely India is drawn upon by the world for its drug supply. The further development of the natural drug resources of India would prove materially beneficial. Attention to the scientific cultivation and utilization of these botanicals should therefore be paid by those who are anxious that India's natural resources should be more fully exploited and developed.

In addition to the known and familiar botanicals used in medicine and pharmacy, India possesses a considerable materia medica consisting of vegetable drugs employed in the indigenous system of therapeutics. The majority of these medicinals have never been examined scientifically in regard to their therapeutic action and chemical constituents.

New Match Factory.

The establishment of match factory in Rangoon by Messrs. Adamjee Hajee Hawood and Company will be a most valuable acquisition to the industries of Burma. The preparations are nearing completion and work is expected to commence very soon under the guidance of a specially trained European expert. The machineries installed comprise the shaping and cutting of the splints, the dipping of ends into chemicals for the head, the making of boxes, the fastening of the ignition slab, the labels and finally filling with matches and packing into packets. Practically everything will be done automatically. If the present venture proves successful, the promoters propose starting a second factory capable of turning out 1000 gross daily.

Indian Exhibition in Germany.

We understand from the Indian Bureau of Commerce and Industry, Berlin-Charlottenburg, Grossestrasse, 16a that for the first time in the history of Indian industrialism an exhibition of the Indian national industry products and raw material is being organised for the International Leipzig Fair to be held during the first week of September next In passing it may be mentioned that Leipzig Fair is one of the biggest exhibitions of the world where hundreds of thousands of people of all nationalities gather to study industrial developments and make purchases.

We are glad to announce that the Behar School of Engineering has been raised to the status of a College of Engineering up to the standard of the Bachelor of Civil Engineering examination with effect from July next.

German Silver.

GERMAN silver is an alloy of copper, nickel, and zinc the quantities varying considerably in different samples as may be seen from the following figures :—

Copper	50	to	66	parts
Zinc	19	to	31	,,
Nickel	13	to	18	,,

The product of each recipe bears a particular name and is offered to the trade as such. The most common names for German silver are nickel silver ,and argentan. Packfong, White Copper, Silveroid, Nevada silver, Potosi silver, Viriginia silver, etc are some of its trade names. It is also known as argent-neuf, weiss-kupfer, etc.

It is thus impossible to give a definite composition for German silver, inasmuch as it varies according to the manipulation the article manufactured from the alloy is to undergo. Three typical analyses may, however, be quoted for guidance.

	Copper	Nickel	Zinc
Best	52	22	26
Medium	59	11	30
Ordinary	63	6	31

It is suggested that for alloys containing less than 16 per cent of nickel the quantity of zinc should be 30 per cent in order to give the best results,; while with alloys containing more than 16 per cent of nickel the quantity of zinc should be less than 30 per cent., the remainder of course being made up with copper. As regards the impurities found in German silver, those most often met with are iron, lead and tin.

German silver is made by melting the metals in the usual way in graphite crucibles. The separate metals, however, are not melted together ; but are used in the form of alloys of copper and nickel and of copper and zinc. The zinc and nickel to be used for a certain quantity of copper are divided into three equal portions. On the bottom of the crucible is placed a layer of copper, on this is put a layer of zinc and nickel, and upon this again a layer of copper. These layers are continued until all the copper is in the crucible, retaining, however, one-third each of the nickel and zinc. The contents of the crucibles are covered with a layer of charcoal powder and are melted as quickly as possible at a high temperature.

When the metals are in a molten condition they are intimately mixed by stirring with an iron rod. The reserve zinc and nickel are then added, and the mass is vigorously stirred after each addition. A high temperature must be maintained throughout. Shortly before pouring the metal a further piece of zinc may be added, to compensate for volatilisation and ensure thorough deoxidation of the alloy. There are different methods for the casting of the alloy. It is either at once cast into plates, which are subsequently rolled into sheets ; or cast into very thin sticks, which after cooling, are re-melted and finally cast into plates. The method of casting is exactly the same as in the case of brass ; but it is necessary to run it into the moulds at as high a temperature as possible and in an uninterrupted stream. The moulds should be previously besmeared with fine lampblack to prevent adhesion.

Generally speaking, German silver is superior to brass as regards hardness, strength and power of resisting chemical influences, the latter property making it especially valuable for certain purposes. In respect to its preparation it is, however, a very subtle mixture, and exceedingly small quantities of foreign metals exert a considerable influence upon the physical properties of the alloy.

An addition of 1 or 2 per cent of iron will increase the strength, hardness and elasticity of the alloy, and at the same time make it slightly whiter. It is therefore advantageous for some purposes. For ornamental castings, an alloy containing 1 or 2 per cent of tin is frequently used. It makes the alloy densre and more sonorous, and causes it to take a better polish. Lead is purposely added to the extent of 2 or 3 per cent when the metal is to be cast and subsequently worked.

The mechanical manipulation of German silver is attended with some difficulties. The plates are slightly rolled and hammered, being annealed at each stage. By this treatment they gradually lose their crystalline structure. Only then they can be worked with ease, and rolled and stamped into any desired form, most articles being prepared by the latter methed. Like alloys of the precious metals, German silver has the property of retaining its metallic colour and lustre when exposed to air and water. Moreover, it remains untarnished by dilute acid as frequently occurs in foodstuff.

Articles made of German silver may be electro-plated with silver. They will then exhibit the colour of chemically pure silver, which they will retain for a time depending on the thickness of the deposit.

German silver can be readily soldered, the alloy used for this purpose being made more fusible than the German silver by having a larger proportion of zinc. The usual composition of German silver solder is : Copper 47 per cent, nickel 11 per cent, and zinc 42 per cent.

Transmutation of Metals.

IN every age and in every clime there has existed a deep rooted popular belief in the transmutation of the elements. The faith almost bordered on the supernatural and was often shrouded up in mysticism. It will therefore be interesting to trace the trend of human knowledge in this respect from the early days of alchemy to the present age of radiology.

Briefly speaking, alchemy, is the art of transmuting the base metals into the noble ones. The idea of such transmutation probably arose among the Alexandrian Greeks in the early centuries of the Christian era. The fundamental theory of the transmutation of metals is to be found in the Greek alchemists, although in details it was modified and elaborated by the Arabs and the Latin alchemists. Regarding all substances as being composed of one primitive matter (prima materia) and as owing their specific defferences to the presence of different qualities imposed upon it, the alchemist hoped, by taking away these qualities, to obtain the *prima materia* itself, and then to get from it particular substance he desired by the addition of the appropriate qualities.

The more direct object of alchemy was the production of gold and silver. The principles of the alchemists was, that the baser metals were all controvertible into these two precious substances by a long series of processes. The instrument by which it was supposed that this mighty change was to be effected, as a certain mineral to be produced by these processes, which, being mixed with the base metal, would trassmute it ; and this was called the philosopher's stone. Innumerable instances are on record of persons who practised on the credulity of former times by professing to possess this stone, and who actually wrought the transmutation required and it is supposed that the philosopher's stone employed by these personages was nothing more than an amalgam of gold, which, if projected into tin and cupellated, would leave a portion of the precious metal.

As showing the possibilities of transmutation the following achievements in scientific research will be read with interest.

An eminent French Physicist has succeeded in transforming sugar into diamonds. Three English Professors have shown that it is possible to transform water charged with carbonic acid gas into sugar by the action of ultraviolet light. A lady investigator has found that moonshine is capable of converting starch into sugar. These are a few of the many methods known and recently discovered, of converting atoms of humble substances into those of greater value, and so to extract, as it were, wealth. Poorly coloured and almost valueless specimens of sapphires, rubies and other stones are being transformed into gems rich and rare, simply by a stimulating bombardment of radium emanations.

The production of helium by radium was investigated by Ramsay and Shoddy. Purified emanation from about 50 milligrammes of radium bromide was introduced into a small spectrum tube. No helium could be detected spectroscopically immediately after the introduction of the emanation but after standing for four days the helium spectrum appeared with all its characteristic lines. This showed that helium is produced directly by the transformation of radium emanation. It was the first definite evidence of the production of a known element during the transformation of radio-active matter. Boltwood and Rutherford found experimentally that 164 cubic millimeteres of helium are produced per gramme of radium per year.

In 1908 Ramsay suggested that the difference between the various elements depends on the loss or addition of electrons, and that the transmutation of the elements is thus possible; he declared further that he had transformed copper into lithium by the action of radium emanation (a fact seriously contested, that he had obtained carbon monoxide and dioxide by acting with radium emanatien on the following group of elements ; silicon, titanium zirconium, thorium, and lead, and that the action of niton (the emanation of radium) on water yields neon.

Now the emanations of radium will continue for nearly 2500 years by which time it will be transmuted into lead. Incidentally this will give an idea of the enormous period required for a complete conversion.

In 1909 Rutherford and Royds showed that the a-particles of radio-active substances are none other than helium atoms carrying an electric charge, and in the same years Perman showed that copper and gold do not undergo any change through the action of radium bromide. The statements of Ramsay, therefore, need to be confirmed bv other experimentalists before they can be accepted as decisive. The formation of radium from uranium appears to have been demonstarted experimentally with certainty by Soddy in 1909 ; thus a solution of pure uranyl nitrate which did not contain any radium certainly contained radium after three years have elapsed. Ramsay affirmed that he obtained traces of lithium by the action of the radium emanation on copper. He also decomposed hydrochloric acid, ammonia, and carbon dioxide into their elements and finally regenerated those compounds from their respective elements by means of radium emanations.

The chemical atoms constituting the simple substances are very stable systems, because it has not been found possible by any method to restore to them the energy which they have lost in order to transform them into electrons.

Although it may be admitted that all these facts tend towards the hypothesis of the unity of matter, or better of the existence of energy only, up to the present the experimental results in this field are not sufficiently advanced to accept this hypothesis as definitely proved. Of all the elements, only radium has hitherto been transformed into helium but not iron into gold, hydrogen into copper, or any of the better known elements into any other. If there is any tendency, it is in the sense of a transfomation of an element of high atomic weight into one of lower atomic weight.

In recent times, Prof Soddy has made it perfectly clear how gold can be got say, from lead Expel from each atom of lead one "alpha" particle, and the lead becomes mercury, then expel from each atom of mercury one "beta" particle and the mercury becomes thallium; now deprive each atom of thallium of one "alpha" particle,—and you have got gold in place of lead.

But simple though the process is in theory it is extremely difficult and expensive to effect, for atoms hold unto their particle by devious means, and so it is the problem of dislodging these "alpha" and "beta" particles that is the present bone of contention between man and the atom.

Bleaching of Silk.

SILK must be treated in different ways before dyeing according to the condition in which it has to be dyed, such as raw silk, souple silk, etc.

RAW SILK.

Raw silk is treated in a luke warm bath with 6 to 8 per cent. of soda, calculated on the weights of the goods. After turning the silk for several times, and when the serecine is dissolved off, the silk becomes soft and glossy. This treatment has to be carried out very quickly—bath should not get above 95°F, otherwise silk becomes affected and loses too much of its natural gum. Afterwards rinse well and dry.

SOUPLE SILK.

To produce souple silk special treatment has to be resorted to, whereby the silk loses 5 to 10 per cent. of its wts and acquires almost all the properties of boiled off silk. After the silk has been softened and cleaned in a weak solution of soda (as in the case of raw silk) treat at 130°—185°F in a bath of $6\frac{3}{4}$ oz. tartar $1\frac{1}{2}$ oz. sulphuric acid and $1\frac{1}{8}$ oz. aqueous sulphurous acid per 10 lbs. silk, in order to soften the silk which has become hard and brittle by previous treatment. Finally rinse first in warm water then in cold water.

Silk Bleach in Hydrogen Peroxide :—
Bath for 20 lbs. silk.

24 gallons of water.

·5 gallons of solution of Hydogen peroxide.

$38\frac{1}{2}$ oz. of sodium silicate.

$38\frac{1}{2}$ oz of soap dissolved in water.

Temperature of the bath should be 120 F.

Immerse the silk completely in the bath—working occasionally for about one hour Finally acidulate in sulphuric acid bath and rinse well.

By MR. SATISH CH. ROY, B.SC.

Canning—How it is Done.—II.

[The following methods of processing are practical, ready for use ; they have been tried and used by men who achieved success in the industry].

FRUITS.

The prime condition for canning of fruits is that state of maturity in which the flavour and other characteristic qualities have been developed to the maximum and may be retained during sterilization.

APPLES.

Apples used for canning should be of varieties that cook well. They should be slightly acid, smooth and sound, and without bruised spots. The peeling is done by hand and by power peelers, the peeled apple is placed in cans as quickly as possible, and hot water is added to make the fill. The process on apples is about 8 minutes at 212° F. for No. 3 cans and 10 minutes for No. 10 cans.

APRICOT.

Apricot receives the appropriate syrup, is exhausted until hot, and processed for 6 to 12 minutes. The syrup of 20 degrees must be used.

BLACKBERRIES.

The use of 40 and 50 degrees syrup gave better results. The physical condition of the product is influenced by the lenth of time given in processing and by cooling. With delicate berries, however the cooling should not be so sudden for the best results. Time for processing should vary from 10 to 25 minutes.

CHERRIES.

The best results obtained. when the syrup is added at about 120° F. and heat gradually applied until the temperature reached 190° F. in 30 minutes. The syrup for pitted cherries of 30 degrees is suitable and for whole cherries 40 degrees is best.

GRAPES.

The fruit is washed and the cans filled to within one-fourth inch of the top and a hot syrup added. After exhausting, a process of 212° F. is given for 14 minutes.

PEACHES.

Syrup of 40 to 55 degrees is added, the can exhausted for three minutes, sealed, and processed for from 12 to 20 minutes at 212° F.

PEARS.

The flavour is impaired rather than improved when more than 25 degrees syrup is used. After the hot syrup has been added, the cans are exhausted, then processed in an open bath from 10 to 20 minutes.

PLUMS.

Plums are washed, and the imperfect or spotted fruit picked out ; ordinarily the plum is not peeled. The cans are then filled, some care being necessary in placing the plums so that the fill will be uniform. Hot syrup is added, and the cans processed at 212°F. for from 8 to 14 minutes.

RASPBERRIES.

The use of a syrup of the right degree is essential in bringing out the rich flavour, experiments have shown 20 to 30 degrees syrups the best. The process takes 12 minutes at 212°F.

STRAWBERRIES.

The strawberries need a syrup of 30 to 40 degrees to develop its flavour. After a sufficient quantity of syrup to fill the can has been added, it is exhausted for 30 minutes, sealed, and processed for from 10 to 12 minutes.

VEGETABLES.

The distinctive feature in the canning of vegetables is that they require heavier processing fruits, and for sterilization need a higher temperature, or longer time or both.

ASPARAGUS.

The interspaces of the cans are filled with brine testing about 8 degrees Balling (about 6½ ounces of salt per gallon of water). The process takes from 12 to 22 minutes at 240° F. and the cans are cooled at once.

STRINGBEANS.

A weak hot salt brine is used to fill the cans, which are exhausted, capped, and processed for 30 minutes at 240° F. A full can should weigh not less than 13 ounces, exclusive of the liquor.

BEETS.

The process on beets is 245° F. for 1 hour.

CORN.

The corn requires a temperature of about 250. F. for 75 minutes to insure sterilization, some packers process at from 240° to 245° for 90 minutes. The consistency of the corn makes a great difference in the heat which must be used ; the drier the corn the slower the heat penetration.

PEAS.

The liquor is added after the peas have been put in the can. The subsequent capping and processing is the same as for corn. The process is from 235° to 240° F. for from 35 to 40 minutes, depending upon the freshness and state of maturity. The cans of peas should be immersed in a cold bath at once after process is finished, in order to arrest cooking and insure a clear liquor.

SPINACH.

The cans are thoroughly exhausted and then processed for from 35 to 40 minutes at 235° F.

TOMATOES.

The regular packed tomatoes should be well exhausted, sealed and processed for from 35 to 55 minutes, the more solid the pack the heavier the process required. For fancy tomatoes it is better to exhaust slowly to about 120° F. some packers process in the retort at 220° F. for 25 minutes. It is preferable to cool the can at once in order to obtain a better colour.

MARINE PRODUCTS.

CRABS.

The meat is filled in cans and processed. The No. 1. cans generally used are first heated for a half hour in boiling water, vented and then processed for one hour at 240° F.

OYSTERS.

The cans are capped in usual manner, either by hand or machine and are then processed in the retort at 240° F. ; the No. 1. cans for 12 minutes and the No. 2. for 15 minutes. The different manufacturers vary the time but practically all use the same temperature.

SALMON.

The process consists of heating at 220° F. for 30 minutes, the taking out the fish, venting, and retipping, and giving a subsequent heating for 1 hour and 15 minutes at 250° F.

SARDINES.

The fish are dressed, scaled, heads removed, then dipped into a solution of strong brine for a few minutes, rinsed and dried. After they are perfectly dry, the fish are put in the boiling oil for 5 minutes until they are cooked thoroughly. They are left in the trays to cool for couple of hours, then placed in the cans by hand, oil or sauce added to fill the interspaces, carefully exhausted, and processed at 240° F. for 1 hour and 15 minutes.

SHRIMP:

Shrimps are put up in what are known as dry and wet packs. In the dry pack no liquor is added, while in the wet pack it is used. The process for dry shrimp is 1 hour at 240° F. or 4 hours at 212° F. for No. 1. cans, and 75 minutes at 240° F. and 4 hours at 212° F. for No. 1½ cans. The process for wet shrimp is 11 minutes for No. 1. and 12 minutes at 240° F. for No. 1½ cans.

SPECIALITIES.

JELLY.

Jelly making usually consists of the following steps. The fruit is first crushed or sliced. Water is added and the fruit is boiled until soft to extract pectin. The mixture is then strained or pressed. In commercial practice the resulting juice is filtered clear through a pulp filter. Sugar is then added—a pound of sugar per pint of juice if the juice is deficient in either or both of these constituents. The mixture is boiled to the jelling point. A boiling point of 220-221 is frequently used as the "stopping point." The jelling point will depend upon relation of pectin-acid and sugar. A jelly should have about 65 per cent sugar, 3.05 per acidity (as citric) and the pectin concentration be 1.5 per cent.

PRESERVES.

In making preserve use one pound of fruit to one pound of sugar. Cook the fruit without addition of water to 219° F. use a teaspoonful of coconut oil or any other oil just to avoid the stickiness. In case to impart an acid taste, a little amount of citric acid would not hurt.

JAMS.

The manufacturers use pectin in making jams, pectin in other words is a commercial name for a concentrated juice of sour apples. To prepare jam use 5 gallon apple juice, 70 pound sugar, 30 pounds fruits or berries, cook the whole material until thick just like jelly, do not heat above 219° F.

MANGOE.

"Mangoe does not grow in United States of America, but I managed to get two dozens of mangoes from Havana (Cuba ; W. I.), they cost us in Cleveland, Ohio. (One dollar) 3 rupees a piece, anyhow the experiment was carried on in Wm Edwards and Company's manufacturing department with the help and advice of Mr. Frank Wurtz in charge of Preserve Department. Success and its credit was the outcome of his twelve years' experience in the "Fruit Kingdom." I am going to lay down some of the results I obtained."

Mangoe was washed and peeled, it was just in ripe condition, it was cut in two halves the cores were taken off then the fruit was filled in cans, and syrup of 18, 26 and 30 degrees was added in three different cans, the can exhausted for 3 minutes, sealed and processed for 20 to 25 minutes at 212°F. After six months the cans were opened and the fruit with 30 degree syrup and 20 minutes process period was in the best condition, while others had lost some of their colour and flavour.

CAUTION.

"No large pack of goods should be put up until a trial batch has first been made."

—BY MR. SHADI RAM SHARMA.
Mechanical Engineer,
Purdue University.
Lafayatte, Indiana, U. S. A.

British Empire Exhibition.

AFTER years of strenuous preparation the British Empire Exhibition was opened by H. M. the King Emperor on 23rd April, 1924. It is an epoch-making exposition of the vast resources, arts and crafts, industrial products of an empire on which the sun never sets. Wembley near London, the site of the Exhibition, is to-day the epitome of the British Empire.

The Indian Pavilion constitutes one of the outstanding architectural features in the whole layout. Its style is based generally on Mogul architecture of Northern India in its seventeenth century prime. The whole pavilion covers three acres of ground and represent the artistic beauties of the Taj Mahal at Agra and the Jumma Masjid at Delhi.

The Goverment of India sanctioned expenditure to the amount of about £200,000, to which the participating provinces added £125,000 in addition to the munificent co-operation of Indian States. The available accommodation in the Indian Section exceeds 100,000 square feet. Each contributing province of British India has a space ranging from 7,000 to 12,000 square feet, while a number of great Indian States have secured space ranging from 5,000 square feet downwards. In all there are twenty-seven sections each in charge of a separate officer.

Important Indian States such as Kashmir, Mysore, Travancore and Jaipore have also contributed their quota of the arts and crafts and the commerce and industries of their respective territories.

In the case of exhibits from Kashmir, the Government of the Maharaja has provided exhibits of the extra-ordinary varied art wares of the State. A notable feature is the beautiful carved screens presented to the King by the Maharaja and loaned by his Majesty. Similar care has been taken to ensure satisfactory selection by the States of Mysore, Patiala, Bikanir, Jaipur, and Travancore, to mention only a few of the State courts presenting special features in arts and crafts.

India's contributions to fine art, both modern and reproductive, are well represented. Pictures and bronzes representative of the different schools of art in India were selected there by a representative committee.

The exhibits of Burma correspond to general knowledge of the country's products. The manufactures chiefly comprise cottage industries ; but these appear in a great and attractive variety. Of natural products, on the other hand, everything is represented that is known to be produced in the country. Agricultural produce, of which some kinds—rice, for instance—are not appreciated as much as their nutritive value deserves; forestry, in which great scope remains for development, though, as the exhibits prove, much has already been done to show the singular beauty, variety, and utility of Burmese timber ; rubber, oil minerals, precious stones, silk, cotton, and tobacco ; all appear on a large scale. In the grounds an interesting exhibit shows the local method of treating oil shale.

The Indian exhibits consist almost entirely of two classes. In one is represented the products of each participating province—Bengal, the United Provinces, Madras, Bombay, the Punjab, Baroda, Indore, Patiala, Behar and Orissa, Bikaner, Cutch, Jodhpur, Kathiawar, Jaipur, Khambata, Mysore, Travancore, Bharatpur, Khairpur, and Kashmir. The others are still more collective : the famous Survey of India, the Geological Survey, the Meteorological Department, the Railways, the Army, measures of social service, co-operation and education, and commercial intelligence ; timber and forestry, tea, and cotton, with a central hall devoted to retrospective art. These, with one or two individual exhibits, make up the principal Indian contributions to the Exhibition, apart from the theatre, from dramas, and from films to be seen in the Exhibition cinema theatre. The variety they embrace is better imagined than described. The fibres and other products of India's varied agriculture, her forests and their products, her minerals and ores, her indigenous manufactures, are all represented in detail and in profusion ; and many of them, such as cotton and silk, are presented as having still a practically unlimited field for development.

The other great Indian textile, jute, is illustrated in the Bengal Court ; while coffee is shown in the Madras section. Tea, is separately shown under the auspices of the Indian Tea Association. A notable commercial as well as artistic feature is the timber section organised by the Indian Forest Department. The wonderful range of Indian woods is displayed not only by sections of timbers, but also by specimens of their decorative and constructional uses.

The arts and crafts—metal work, carpets, curtains, carving in wood and ivory—for which India has always been famous will be represented, and among the other exhibits will be models showing the Khyber Pass and other frontier parts. Models will also show the advances which have been made in railway construction. Special sections are to be devoted to the great Indian ports, and Indian timber and its uses will form the subjects of a particularly attractive exhibit organised by the Indian Forest Department. Many of the Indian Princes have taken space in which the varied resources of their States will be displayed, each State and Province undertaking the arrangement of its own court. The exhibits will be designed to show India's commercial products to the best advantage.

The great mineral wealth of India is graphically epitomized in the section for which the Geological Survey of India, which dates back to the middle of the 18th century, shows a very good representative collection of the photographical maps, on various scales it produces of the two million square milles including the Himalayan ramparts, for which it is cartographically responsible. The scientific branch shows the development of surveying in the last century and a half, and one of its features is the tide-prediction machine used in connection with the Indian tide tables published annually by the Survey.

The section promoted by the recently-formed Indian Central Cotton Committee brings into relief the steady improvement in recent years in the production of raw cotton, and more particularly in the remarkable extension of areas devoted to the growth of long stapled varieties. The various processes adopted in the treatment of cotton and in the improvement of the indigenous plant are demonstrated.

Sugar on a Small Scale.

ANY estimate of the total production of refined sugar in India should include not only the output of factories making sugar direct from cane, and of modern refineries working with *gur* or rab as their raw material, but also sugar refined in small establishments following the indigenous method of sugar making. As will be seen below, this industry is not insignificant, as it produced no less than 58,000 tons of sugar in the year 1920.

The amount of sugar refined each year depends entirely on the price of sugar and the character of the season. In fact the decline of this industry synchronizes with the increasing import of cheap foreign sugar. The stock in trade required is practically nil, consisting of a masonry pit, and a certain number of sacks, earthen vessels and the bamboos through which the molasses run.

This process of sugar making is extremely wasteful as it enables the *khandsari* to recover only from three to four maunds of sugar from 100 maunds of cane against nearly 9·5 maunds obtainable in up-to-date factories and 4½ to 5½ maunds obtained in modern refineries working with *gur* as their raw material. The cost of production is so high that it has a limited market only among orthodox Hindus, the product not being able to compete with imported sugar or sugar made in India by modern factory methods. As a matter of fact it is only the prevalence of a religious sentiment among Hindus in favour of country made sugar free from the use of bone char in refining, which has enabled this process still to exist in some parts of India, e.g., United Provinces, Punjab, Bihar, Bengal and Madras.

A brief description of the process will not be without interest to some readers. In the United Provinces where rab (mix crystallized sugar and molasses) is the material used for refining, it is put into gunny bags which are stacked in piles and are pressed down by the feet. The molasses exudes through the bags and runs off in small drains. The resulting product is then removed from the bags and stacked to a depth of three or four feet on bamboos covered with reeds or cotton stalks. The further treatment to which it is submitted is similar to that used for refining *gur*, a description of which is given below.

It may be mentioned at the outset that country *gur* refineries work on more or less the same principle. The only difference is in the method of curing which differs in different provinces. The process as described by Mr. Maxwell, manager of the New Savan Sugar Works, is as follows :—

The *gur* is melted down to a density of about 25° Beaume with water and concentrated to a massecuite in open pans. The finished massecuite is either cured in hand centrifugals, which is no doubt the more economical method of the two, or is discharged from draining baskets consisting of a wooden frame work 2ft. wide 4ft. long and 2ft. deep lined with bamboo matting through which the mother liquor is allowed to drain out in the course of a month or three weeks, according to the viscosity of the boiling. The result is a yellow-brown concrete sugar remaining inside the matting lined box. In order to obtain a higher grade of sugar (i.e., a fine whitish grain sugar) this sugar is covered with a layer of one to two inches of a water-weed called *Sewar*, which is renewed from time to time. The action of this weed is two-fold, viz., gradually dissolving the film of molasses surrounding the crystals, which is carried downwards and ultimately oozes out through the apertures of the bamboo matting and (2) the bleaching effect produced by the acids of the weed. The process is obviously very slow. From time to time, a layer of a few inches of the clarified sugar is scraped off the top as a whitish concrete sugar. This is spread out on mats and the adhering crystals are separated by the primitive method of trampling with the feet. The result is a granulated, fine grain, whitish sugar, which commands a high price in the market as being real deshi sugar.

In Southern India when country sugar is to be made treacle is prepared and stored in earthen pots having a narrow mouth. These pots are placed one over the other with their tops down, so that the molasses runs out easily. They are kept in this position for not less than two months. The raw sugar is then transferred to cylindrical bamboo baskets and undergoes a process of refining similar to that described as prevalent in other parts. The resulting product is called *china*, which is further subjected to boiling, addition of milk water and removal of impurities. The final product so obtained is called *bura*. It is dried in the mats for a day or two and then packed into bags.

In the year 1920, when the price of sugar was the highest ever recorded, the Directors of Agriculture in the various Provinces were requested by the Secretary, Sugar Bureau, to ascertain the extent of this industry in their respective provinces and furnish information regarding the number of such refineries and their total output. From the returns forwarded by them the number of refineries in operation in 1920 worked out to 3,188, of which 1,791 were in the United Provinces, 1,086 in the Punjab 206 in Bihar and Orissa, 81 in Bengal, 22 in Madras, and one each, in Assam and Burma. In the Central Provinces, Bombay, and the North-West Frontier Provinces, no such refineries were reported to be in existence.

The total output of sugar from these establishments is given below :—

	No. of establishments.	Sugar made	
		in mds.	in tons.
United Provinces	1,791	13,08,748	47,989
Punjab	1,086	32,980	1,200
Bihar and Orissa	206	1,10,202	4,049
Bengal	81	77,925	2,857
Madras	22	59,388	2,179
Assam	1	948	35
Burma	1	300	11
	3,188	15,90,49	58,320

As mentioned above, the industry depends for its existence not upon economic grounds but on religious sentiment. With the gradual weakening of that sentiment, the establishment of more modern factories in India, and the increasing cheapness of the product manufactured in up-to-date factories; this industry will lose its importance even if it does not wholly die out. (In Bengal the industry is prevalent in the two districts of Jessore and Faridpur, where the jaggery or *gur* refined is produced from date palms.)

—LOUISIANA PLANTER.

Match Industry in Bengal.

WITH a view to determine the prospects of match manufacture in Bengal, Mr. A. P. Ghose, M. S. C. I. (Lond), a match expert of repute was deputed by the Department of Industries to carry on certain investigations. The results of his enquiries have been embodied in Bulletin No. 16, Report on the Investigations into the Possibilities of Match Industry in Bengal to be had from the Bengal Secretariat Book Depot, Calcutta for 12 as. only. Every aspect of the question has been treated in this pamphlet. Match manufacture on a large scale as well as on a small scale ; favourable sites, for locating factories ; suitable woods for splints and veneers, regularity of timber supply; estimates of match factories, etc. Prospective manufacturers would do well to go through the book carefully and ponder over the observations of the writer before deciding to launch upon any scheme. As we are concerned more directly with match manufacture on a cottage industry system we quote the following considerate opinion of the expert.

"If the match industry is to be developed as a cottage industry it should not be the idea and should not even be necessary to erect a complete small scale factory. In fact the match industry should be divided into three main branches of (1) splint making, (2) box making, (3) finishing of matches, each forming a complete unit. Each of these branches should be regarded as a complete industry in itself and should be worked in cottage industry systems as well as on a large scale.

The splint and box-making industry on a cottage industry scale may be started with the help of locally made machines whereas for the finishing of matches improved machines and implements of foreign make should be utilised.

It is, however, practically possible to work small factories successfully on the basis of home industry systems, but sufficient precaution should be taken in the initial stage to guard against the causes which have led to failures."

He arrives at the following conclusion, "The match industry can be developed in Bengal along various lines from home or cottage industry scale employing a very small capital to huge modern factory with a big outlay. But the basis of all scale of work should be up-to-dateness and efficiency. The use of modern machines, implements and methods can alone lead to success. There is room for very small and big factories and they could thrive side by side provided they are based and worked on proper lines."

As regards the types of machines to be employed he recommends :

"For technical reasons the peeling and frame filling systems will be the best for Bengal if it is intended to work a factory on a fairly large and commercial scale. If it is desired to carry out the industry on a very small scale as a home industry the locally made splint and box veneering machines supplemented by German or Swedish machines for finishing purposes would best serve the purpose."

We commend the Report of Mr. Ghose to the notice of all who are interested in the growth of Match Industry in this country.

Ideas for Small Capitalists.

Poultry Farming.

Messrs Joe-Pack & Bros, W/55 Near Police Lines., Kamptee have sent us the following : –

It is a fact that the population of India is increasing and with it the consumption of foodstuff. Everyone tries to find some means or other to supply and to be supplied with the needs of every day life. There is a simple solution for this problem which can easily be adopted by any person with a small capital.

The first thing required in poultry farming is a spacious ground, (say a a waste land near the residence which can be had on rent) enough to accommodate 1000 to 5000 fowls. This plot of ground should be properly fenced so that fowls may not go astray ; some portion of the ground being reserved for making rest houses for the fowls to rest at night.

After having done this the person is simply to go to neighbouring villages to purchase cocks and hens.

It is quite possible to get hens that can lay eggs at the rate of 12 annas each and nice good bred cocks at Re. 1 each.

Coming to facts and figures it is obvious from the following statement that income in this business increases cent per cent every year.

100 hens at annas 12 each	Rs.	75 0 0
20 cocks at Re. 1 each	,,	20 0 0
Miscellaneous expenditure	,,	5 0 0
Total	Rs.	100 0 0

All hens are allowed to hatch soon after they lay eggs say 100 chickens are hatched at the average of 10 eggs each within a month's time the owner will have 100 hens and 1000 chickens. Chickens grow fully in six month's time and at the end of six month's time the owner has 1120 fowls in all.

Total expenditure for 6 months.

1. Rent of the poultry yard at Rs. 10 p. m.	Rs.	60 0 0
2. Fencing and making rest houses	,,	40 0 0
3. Cost of fowls and misc. expenditure	,,	100 0 0
4. Food for 6 months at Rs. 5 p. m.	,,	30 0 0
Total	Rs.	230 0 0

Now if he wants to sell 1000 fowls he can find a ready market for them at the rate of 8 annas each, i. e., he can sell them for Rs. 500 After deducting the expenditure, Rs. 230, he has got a net profit of Rs. 270.

But it is advisable for him not to sell all the fowls but only a certain number so that he can let the remainder hatch soon after they lay eggs.

It is certain that the number will increase to 5000 in proportion to the eggs successfully hatched. And hence the income doubles and trebles in a very short period of time. At the end of 1 year the owner will have many fowls and eggs which can be arranged with a contractor for sale.

Small Trades & Recipes.

Luminous Paint.

A mixture of 100 gms of pure precipitated calcium carbonate and 30 gms of powdered roll sulphur is heated to a dull red heat for an hour in a covered crucible. When cold, the white calcium sulphide thus obtained is impregnated with 1 to 1000 solution of bismuth. For this purpose a solution of 0·3 gm. of basic bismuth nitrate in 200 c. c. of absolute alcohol, containing a few drops of nitric acid, is employed. 10 gms. of the calcium sulphide is made into a paste with absolute alcohol, and 1 c. c. of the bismuth solution is added to it and thoroughly mixed. After drying, the mixture is carefully heated in a covered crucible to an incipient cherry red heat for two hours. It is then allowed to cool slowly in the furnace. This produces a fine violet phosphorescence. Any pale spirit varnish or drying oil may be used as a medium. Solutions of gelatin, gum arabic, and even starch mucilage may also be used. The ingredients of the luminous material should be as pure as possible. A highly phosphorescent product will result.

Candy Sticks.

Melt 1 lb granulated sugar in 1 gill of water, add 4 oz glucose and stir until dissolved. Boil until the toffee breaks crisply when put in cold water. Then pour on to a large earthenware dish and flavour and colour to taste. Fold over and over with a wooden spatula, and when cool pull out with the hands, double and pull again until it is too hard to work any longer. The last pulling should be rather thin. Cut in sticks and put in an airtight bottle.

A great variety of this inexpensive but wholesome sweet can be made by adding different flavour and colour.

Disinfecting Fluid.

Rosin	26	Per cent
Light creosote	61	,,
Petroleum	3	,,
Caustic soda	2·5	,,
Water	7·5	,,

The creosote should be of sp. gr. 1·025 and show approximately 18 per cent tar acids while petroleum must be of sp. gr. 0·815.

Dye Soap.

Dye soap is prepared by taking 1 lb. of common white or coloured yellow soap mixing with it aniline 1 drm and dissolving it in 2 oz of gin and 2 oz of water then working up the mass in a clear paste and moulding it to the desired shape with stamps on.

Incense Sticks.
(Agarbatties)

	Parts by wt.
Red sandal wood	100
Gum benzoin	15
Balsam of tolu	20
Sandal oil	3
Oil of cloves	2½
Neroli oil	1
Purified nitre	10
Gum tragacanth	3

The solid ingredients should be reduced to very fine powder and mixed thoroughly. The aromatic essences should then be incorporated carefully. Finally they should be agglomerated on sticks with the help of a solution of the gum. The above recipe will yield a red stuff.

SCIENTIFIC AND INDUSTRIAL TOPICS.

Utilising Sour Milk.

Sour milk, of which a huge quantity hitherto used to be wasted is now utilised in England in the manufacture of what are known as "neolyte" products.

By scientific treatment the valuable compound casein is extracted from the milk. The sourer it is the better for the purpose. From the products by the addition of acid, the fat is extracted, and the residue is subjected to very high pressure.

New Earthquake Detector.

The invention of a portable seismometer or earthquake-measuring instrument, cheap, accurate, and easily set up is announced by an American physicist of repute. The principle of the new invention is the twisting effect of earth movements upon a piece of fine vertical wire to the middle of which is attached by one side a small weight. The ends of the wire are fastened to a frame-work which in turn rest upon a solid peer of masonry, or other structure fastened securely to the earth's surface. Earthquakes in one this fram work while the attached weight remains still. This results in a twisting of the wire, which is measured by the reflection of a beam of light from an attached mirror. A continuous record is possible by directing the beam of light upon a roll of photo-sensitive paper revolved by clock-work.

Copper as Preservative.

Recent experience indicates that copper will be used in the future for preserving rope instead of tar, which is used at present. Impregnating rope with tar does little good, for the marine pests literally eat the tar out of the rope and then devour the rope itself. The copper is applied in a solution of oil. Bulking less, weighting less and costing less to apply than tar, copper looms large as the rope preservative of the future.

A New Motor Fuel.

It is reported that an Alsatian chemist has invented a new fuel to replace petrol, which, he claims, will revolutionise the entire system of road transport. The fuel, which is derived from charcoal, replaces petrol gas by a gas consisting of 30 per cent. oxide of carbon, 2 per cent. methane and the remainder azote, a derivative of nitrogen. The invention enables the engine to manufacture its own gas at a very cheap cost.

Uses of Lead.

The extreme malleability of lead makes it possible to use this metal for many purposes for which other base metals are unsuitable. Thus it is extensively used as sheeting and piping. Industrial lead alloys are used in a variety of ways. Lead-tin alloys, are used for solder, pewter, organ pipes and toys. One of the most important applications of lead is in the manufacture of pigments, especially white lead, and red lead, the latter being also used as a cement for pipe joints. It is also used in the manufacture of glass and in the match making trade Owing to the anti-corrosive properties of red lead it is extensively used as a coating for the protection of structural steel.

Glass and Silica Glass.

Silica glass, made possible within the last few years by the melting temperatures supplied by the electric furnaces differs from ordinary glass in consisting of pure silica or quartz instead of a compound of silica with soda, potash, or other base unlike the common glass, the new material shows great resistance to sudden and extreme changes of temperature and a red hot sheet of the silica glass may be plunged into cold water without tendency to break. Another important difference in the properties of the two glasses is their behaviour to light. Common glass, though transparent to ordinary light, is opaque to ultra-violet rays, but the silica glass from quartz sand fails to pass the light, though that from fine crystal is transparent, and both kinds of the silica transmit a large proportion of the ultra-violet radiation.

World's Largest Generators.

Niagara Falls, the greatest single source of waterpower in the United States, will further transform its great power into electrical energy through the two largest generators ever made. These gigantic generators, to be installed on the American side of the great falls, will each produce 87,000 horsepower, or energy equivalent to the muscle power of 375,000 men. The equivalent of 700,000 tons of coal a year will be saved in addition to the labour and investment necessary in its mining and transportation. Incidentally, a record has been set for low labour cost per unit of energy generated. Each generator will weigh 700 tons, will stand 35 feet high, and will have a diameter of 35 feet, and will be the largest generators in the world, both in size and capacity.

Rubber Glass.

According to a report in the well-known rubber Journal, The India Rubber World, indefatigable inventive genius has successfully solved a problem which may be expected to lead to most favourable industrial results. The oft-repeated question why glass which is such an important technical article, must combine the drawback of great brittleness with the advantages of transparency, has already found in the invention of hard glass an answer to the effect that brittleness need not be an essential property of glass. On the other hand, hard glass, like ordinary glass, remains rigid and unbending and, for this reason, a new question has been brought forward in technical practice, namely, whether it is possible to produce a flexible composition which, in addition to this characteristic shall be transparent and fully equal to ordinary glass. By means of a process which is kept secret for the present, an English rubber manufacturer, has succeeded in producing a transparent rubber which is justifiably described as "Rubber Glass," because it is absolutely transparent, without losing the original characteristics of rubber. Although nothing definite can be said about the process of preparing the material, it may be assumed with every probability of truth that it consists in chief in an excellent purifying process of the rubber which originally consists of a more or less pale vegetable sap. This becomes dark when dried, so that the dark colouring can only be regarded as a kind of soiling of the chemical substance "rubber." Thin plates of this flexible glass can be used, for example, for the production of medical utensils and, should the composition prove a success, it will doubtless attain general adoption.

FORMULAS, PROCESSES & ANSWERS.

Manufacturing Creosote.

639 *S. C. B., Calcutta, Wants the process of manufacturing creosote and laundry soap.

In the course of distillation of wood tar a heavy oil is obtained which is known as crude creosote oil. It is collected in a special tank and thence conveyed to a washing apparatus, with a mechanical agitator, heated by steam. Here the stuff comes in contact with a solution of caustic soda of 10-15 per cent. Creosote and all the phenols present go into solution in the soda, whereas the other insoluble fractions collect on the surface of the alkaline solution and can be separated. The alkaline solution is then treated with direct steam, in order to eliminate therefrom the volatile impurities not combined with alkali, until the distillate appears clear as water.

The solution of creosote is then decomposed with hydrochloric or sulphuric acid or still better, with carbonic acid in an analogous manner as in the process of manufacture of phenols of coal-tar. The creosote which separates by decantation from the liquid acid is a crude product, which must be submitted to further fractional distillations and chemical treatments in order to extract therefrom guaiacol and creosote in a pure state.

Laundry Soap.

A good quality of laundry soap may be prepared according to the following recipe by the cold process.

Tallow	31 lbs.
Coconut oil	6 ,,
Rosin	19 ,,
Caustic soda lye (33.Be)	32 ,,
Sodium carbonate solution (35°Be)	8 ,,

The tallow is first melted and then the coconut oil. Next the rosin is introduced. When melted well together, the mixture is allowed to cool down to 130°F, the lye is then added and the soap allowed to stand for about 2 hours. When the soap is finished the soda carb. solution is added and the whole mass crutched well. The product is then moulded as desired or cut into cakes.

Lard and Tallow.

2984 S. K. D., Bareilly. Requests us to differentiate between Lard and Tallow.

Lard is the congested fat of the pig, generally mixed with a small quantity of salt in order to improve its keeping qualities. Besides its use for culinary purposes, stearine and oleine are extracted from lard. The former is valuable in the manufacture of candles, and the latter, under the name of lard oil, has come to be recognised as a useful lubricant for machinery. On the other hand tallow includes the harder and less fusible varieties of the fat of animals, specially that of oxen and sheep. It is composed of stearine, palmitin, and olein in varying quantities. It is prepared by melting the fat of animals at the lowest possible temperature, allowing the liquid to stand and drawing off the clear fat. Tallow is mainly used for the manufacture of candles and soap.

Cleaning Nickel-plated Articles.

348 V. S. S., Jaipur. Desires to be acquainted with the process of cleaning nickel-plated articles.

Nickel-plated articles which have become dull can readily be restored by means of alcohol to which 2 per cent of sulphuric acid has been added. The liquid is applied liberally, and after a few seconds is washed off with clean water. The surfaces are then rubbed over with a swab dipped in fresh alcohol, containing no acid and finally polished with a dry cloth. This method, it is claimed, will give brilliance to the dullest piece of nickel-plating without damage.

According to another recipe a mixture is first made of alcohol 50 parts; sulphuric acid, 1 part; and nitric acid, 1 part. Plunge the article in this bath for 10 or 15 seconds, rinse it off in cold water, and dip it next into rectified spirit. Dry with a fine linen rag or with saw-dust.

Still another formula is: stearine, 1 part; ammonia water, 25 parts; alcohol, 75 parts. Rub up the stearine with the ammonia water, add the benzine and then the alcohol, and agitate until homogeneous. Put in wide-mouthed vessels, and close carefull.

Citral in Lemon Grass Oil.

316 H. S. A., Tinnevelley. Please detail a process of ascertaining citral in Lemon Grass Oil.

The Lemon Grass Oil of commerce is almost entirely an Indian product. Its chief constituent is the aldehyde citral which is present in it from 68 to 85 per cent. Generally speaking, the citral is determined by absorption with sodium bisulphite, but this determination will include bodies other than citral. In some cases, therefore, it is determined by neutral sodium sulphite method but the latter process yields 3 to 6 per cent lower results than the former.

For the determination of citral in lemon oil E. J. Parry first concentrates the oil by distilling off about 85 p.c. of the terpene at a pressure of 12 to 13 mm. The distillate contains only the merest traces of citral. 200 c.c. of the oil thus yields about 25 c.c. of concentrated residue, the sp. gr. of which is first determined. 10 c.c. of the liquid is then shaken with a solution of about 5 grm. of cyanacetic acid and an equal weight of sodium hydroxide in 30 c.c. of water, the operation being performed in a small absorption flask having a long, graduated neck. The unabsorbed portion of the oil is measured and the percentage of citral thus obtained, after correcting for the sp. gr. of citral which is 0.897. The specific gravity of citral is so near to that of the concentrated oil that they may be taken as identical. The cyan-acetic acid used above must be quite fresh.

The Kitson Light.

580 S. D. D., Jessore. Requests us to explain the arrangement of the Kitson Light.

The Kitson lamp was patented in 1885. Originally an oil vapour-air flame produced was used to heat a platinum mantle to incandescence. Now, however, Welsbach mantles are used.

An installation on the Kitson system consists of three essentials, viz., (1) the reservoir, containing petroleum oil, (2) the lamp, and (3) the tubing conducting the oil from the reservoir to the lamp. A vapour tube passes over the burner, and the oil is thereby vaporised and converted into an oil gas, in which form it is consumed in contact with the mantle.

The oil, reaching the lamp cold, through the tubing is conveyed to the vaporising tube and is there gasified by the heat from the mantle, the arrangement being such that only a minute quantity of oil contained in the vaporising tube is subjected to the heat at one time.

The outlet at the opposite end of the vaporising tube is minute like a needle-point. From thence the oil vapour passes into an open mixing tube on the top of the reflector, where sufficient air is drawn in for supporting combustion. The mixture then travels down to the mantle, inside which it burns.

The lamp is lighted by a very simple and ingenious contrivance, which rapidly heats the vaporising tube previous to the turning on of the oil.

Aniline and Alizarine.

570 M. S., Calcutta. Asks how can aniline and alizarine be prepared?

Aniline may be prepared on a small scale as follows. 240 gms. of iron powder is placed with 320 c.c. of water in a large flask and shaken well. The flask is warmed slightly and a few drops of nitrobenzine added. 20 gms. of hydrochloric acid is then poured into the flask and 200 gms. of nitrobenzine introduced. The latter is added little by little and after each addition the flask is shaken thoroughly and cooled under the tap. This operation must be so conducted as to keep the temperature at from 80° to 90°C. when there occurs no further rise in temperature on shaking it indicates that the reaction is finished. Then the excess of acid is neutralized with hydrated lime; and the contents of the flask is distilled with steam until the distillate is no longer milky. It is then transferred to a separatory funnel and the aniline drawn off. The water is now saturated with salt. The oil which rises to the top is added to the first portion and the whole distillate. A little water passes over at first and is collected separately. Finally aniline passes over at 182°C.

Alizarine may be prepared on a small scale as follows.

Dissolve 300 gms. of caustic soda in 300 c.c. of water in an autoclave and stir in 100 gms. of sodium authraquinone sulphorate. Dissolve 18 gms. of potassium chloride in 100 c.c. of the water and thoroughly mix with the mass above obtained. Then fix on the lid of the autoclave and heat the whole for 20 hours at about 170°C. when cool extract the liquid with boiling water several times, and acidify the solution with hydrochloric acid. The alizarine will then separate out. Filter it at the pump, wash with water, press on a porous plate and dry at 120°C.

Constants for Mahua Oil.

626 C. P. C., Bombay. Wants to know the composition of Mohua Oil.

An average sample of Mahua oil contains 17.2 to 20 per cent of free fatty acids and 2.34 per cent of unsaponifiable matter. The following are its constants according to Lewkowitsch.

Specific gravity at 100°C.	0.8971
Melting point	24.0C
Acid value	17.05
Saponification value	188.80
Iodine value	63.01
Viscosity (compared with water)	4.22

Mahua oil is a mixture of stearin, olein, and separated crystals of stearic acid; 20 per cent of olein, 80 per cent of stearin.

Methylated Spirit.

296 H. C., Karnal. Asks how can methylated spirit be prepared ?

Methylated spirit is a form of denatured alcohol, which, in its turn, is simply alcohol which has been so treated as to spoil it for use as a beverage or medicine, and prevent its use in any manner except for industrial purposes.

This de-naturing of alcohol may be accomplished in many ways. Two chief kinds of denatured alcohol are in general and industrial use (1) completely denatured (2) partly denatured.

(1) Mineralized methylated spirit is an example of the first kind. It contains 90 part by volume of ordinary plain spirit, and 10 parts of wood naphtha, together with three eighths of one per cent of mineral naphtha, and sufficient dye to give it a violet tint.

(2) Industrial methylated spirit is an example of the second kind. It contains 95 parts by volume of ordinary plain alcohol and 5 parts of wood naphtha.

The spirit produced in Britain for methylation is substantially the same as that produced for consumption. Nearly three-fourths of the spirit which goes for methylation is produced from molasses. The common form of de-natured spirit consists of alcohol to which one-tenth of its volume of wood alcohol has been added for the purpose of rendering the mixture undrinkable through its offensive odour and taste. Since, however, the wood naphtha interferes occasionally with the use of the alcohol in manufactures and contaminates the products, special de-naturants are allowed in some cases. In these, a de-naturant is chosen with special reference to the manufacturing operation in question, so that whilst still making the alcohol unpotable, it may not introduce harmful contamination.

White Oil.

350 P. P. G., Bombay. Asks what is White Oil ?

White oil is a naturally highly refined volatile petroleum found in Surakhani and some parts of Saboonchi, Baku. The Surakhani product has a specific gravity of 0·780, and consists of—

Benzine	48.9	per cent.
Kerosene	43·9	,,
Other oils	7.2	,,

Standard Ink Specification.

294 G. C. D., Calcutta. Wants to learn the specifications of a standard ink and the tests which should be applied to writing inks to conform with these standard specifications.

The following specification for record ink is on the line of that adopted by the late Prussian Government.

The ink should have the properties of flowing freely from the pen and making a legible and permanent record. It must be a gallate and gallo-tannate of iron ink, not inferior in any essential quality to one properly prepared after the following formula, in which all the ingredients are of prescribed quality.

RECIPE. Pure, dry tannic acid, 23.4 parts, by weight, crystal gallic acid, 7.7 parts ; ferrous sulphate, 30.0 parts ; gum arabic, 10.0 parts ; dilute hydrochloric acid 1.0 part ; and water, sufficient to make up the mixture at the temperature of 15.5°C, to the volume of 1000 parts by weight of water.

Inks may be submitted to the following tests as compared with the standard ink described above :—

(1) A fluid ounce allowed to stand at rest in a white glass vessel freely exposed, in diffused day light, for 2 weeks to the light and air at a temperature of 10° to 15.5°, protected against the entrance of dust, must remain as free from deposit upon the surface of the ink or on the bottom or sides of the vessel.

(2) It must contain no less iron.

(3) It must give as quickly, and after a week's exposure to diffused day light, as intense a black colour when used upon the standard record paper ; and the marks must equally resist changes from light, air, water, or alcohol.

4. It must be as fluid, flow as well, strike no more than through the paper, nor remain more sticky immediately after drying.

An ink made in accordance with this formula should have a sp. gr. of 1.036, and should contain not less then 0.60 per cent of iron.

Castner-Kellner Process.

471 D. C. I, Bhavnagar. Writes, "Please describe fully the Castner-Kellner process of soda manufacture."

The Castner-Kellner Process is the electrolytic method of manufacturing caustic soda and incidentally chlorine gas. By this process considerable amounts of caustic soda is prepared by the electrolysis of sodium chloride. It is typical of mercury cathode processes.

The Castner-Kellner Rocking-table cell consists of a shallow slate tank, divided into three compartments by slate partitions which do not quite touch the bottom. The floor of the tank is covered with mercury which seals the three compartments. Each end compartment is filled with strong brine, the middle one with water.

In each outer compartment there are several graphite anodes while in the centre compartment is an iron grid which serves as the cathode. The cell is pivoted on one end and rests on an eccentric on the other, which raises and lowers half inch once a minute, imparting a rocking motion and causing the mercury to flow backward and forward between the compartments. On passing the current the salt in the outer compartments is decomposed, liberating chlorine at the anodes, which is drawn off by slight suction. Sodium is liberated at the intermediate cathode of mercury and alloy with it. The sodium mercury alloy flows into the centre compartment, where it plates out sodium at the iron cathode. The sodium instantly combines with the water, forming caustic soda and hydrogen. The caustic soda dissolves while the hydrogen is allowed to escape into the room. Part of the current must be shunted off before passing to the final iron cathode.

The salt solution flows through the anode compartment continuously, being brought back to its original high concentration by the addition of salt outside the cell and then returned for refuse. As the sulphates in the brine accumulate, they are from time to time removed by precipitation with barium chloride. The water in the centre compartment is left until the caustic soda has raised its gravity to 1·3. The caustic soda solution is then run off and replaced by fresh water. The lye is boiled down in cast-iron pots till anhydrous and is packed molten into iron drums. It is very pure, often 99 per cent, actual sodium hydroxide.

Alcohols in Tinctures.

472 P. N. K, Bombay. Requests us to suggest a method of determining alcohol in tinctures, etc.

The following is recommended by Thorpe and Holmes for the determination of ordinary alcohol in tinctures and essences. 25 c. c. of the sample, measured at 15·5 C. are mixed with water in a separator to a bulk of from 100 c. c. to 150 c. c. and common salt is added in sufficient quantity to saturate the liquid. The mixture is now shaken vigorously for five minutes with from 50 c. c. to 80 c. c. of light petroleum boiling below 60° C. and after standing for about half an hour the lower layer is drawn off into another separator, extracted if necessary a second time with petroleum, and then introduced into a distillation flask. Meanwhile, the petroleum layers are washed successively with 25 c. c. of saturated brine, the washings added to the main bulk, which is neutralised, if necessary, and then distilled, and the distillate made up to 100 c. c. and its relative density determined at the standard temperature in the usual manner.

Fruit Packing.

21 Q. F. A., Quetta. Asks how to pack fruits for marketing?

Care in gathering is the first necessity, for tasteful packing is of little use if the fruit has already been bruised and disfigured. Speaking generally, most kinds of fruit should be gathered before they are dead ripe though by no means long before. It must be remembered that several days often elapse before it reaches the consumer, so that it has time to become overripe or impartially rotten if too ripe when picked. On the other hand, if gathered too early, the full flavour will not have developed by the time the fruit is consumed, and it is likely to shrivel. But as we have said before, the chief point about gathering is to avoid bruising by rough handling.

Most of the fruits sent, to the market is packed in baskets strewn with straw or hay or dried leaves. This is specially the case with such soft fruits as lichis, mangoes, etc. Hard fruits like apples and oranges may however be stuffed in wooden boxes with holes on all sides. The choice of the package thus depends on the kind of fruit.

The essential point in the actual packing of large fruits is to make them so firm that they will not shake about and bruise, and yet not so tight as to damage them. Little more can be said about packing in a general way. In fancy packing delicate fruits are often half wrapped in white tissue paper.

Rancidity of Coconut Oil.

472 P. N. K., Bombay. Writes, how to remove the rancidity or prevent it in ordinary coconut oil ?

Coconut oil becomes more or less rancid by keeping, owing to fermentative changes, atmospheric oxidation, or other causes. To remove this rancidity the oil is, thoroughly agitated with a weak solution of sodium hydroxide, or a somewhat stronger one of sodium carbonate. The free fatty acids of low molecular weight will be thereby removed while the malodorous non-acid products of decomposition will be dissolved out so as to sweeten the oil. Diluted milk of lime and calcined magnesia are some times used in a similar fashion.

Any oil or fat is best protected from rancidity by keeping it in the dark in a vessel from which all air is excluded ; again as cold has a retarding influence, the vessel should be stored in a cool place. As a rule, oils that have once become rancid, even if pretty thoroughly sweetened by such refining, are more apt to turn rancid again on keeping than fresh ones.

Deodorising Castor Oil.

The same gentleman asks how to deodorise castor oil.

The ordours of oils and fats are due to the presence in samll quantities of volatile substances, either derived from the vegetable substances or formed by slight decomposition of the oil itself For the general purpose of purifying and deodorising the oil, a composition is prepared by granulating together alumina (free from lime), magnesia, and iron, incorporating this mixture with imperfectly burnt charcoal containing organic matter, the whole

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being heated in closed retorts, which are then allowed to cool down before being opened.

Oils and fats can also be deprived of smell by the action of steam. For this purpose the oil is heated in suitable vessels, in which a vacuum may be produced, or through which an inert gas such as nitrogen, carbon monoxide, carbonic acid, hydrogen, etc is passed. As soon as the air is removed, the temperature is raised to between 110° and 220°C, according to circumstances a current of superheated steam being passed through the melted mass until the condensed water is perfectly inodorous. As soon as this is accomplished the steam is shut off and the oil cooled in presence of an atmosphere of the gas previously employed.

There are in vogue numerous methods for deodorising fresh fats. Dry heat, superheated steam, oxidising agents of various kinds, hydrogen, animal charcoal, alkalis, and various salts are used as the active agents in different processes.

Plaster of Paris.

437 J. S. G, Karwar. Asks "What is Plaster of Paris and what are its uses ?"

Plaster of Paris is made from gypsum (naturally occurring calcium sulphate) by heating the latter to a temperature of between 212 and 400 F., when three quarters of the water of crystallization of the gypsum is driven off, the resulting product being plaster of Paris.

When plaster of Paris is mixed with water it sets or hardens very promptly, this change being due to absorption of water, forming gypsum again.

A pure plaster of Paris will normally harden or sets in from five to fifteen minutes after having been mixed with water. If the gypsum from which the plaster is made contains impurities, the set will be much slower than this. Plaster to be used for building purposes must be slow setting. For ornamental use, it must also be white ; and since the impurities usually render the plaster slightly coloured it is the common practice to add retarders to the plaster before placing the same upon the market. The materials used as retarders are usually of a colloidal nature, such as glue, saw dust, blood, packing-house taukage, etc. If a very quick-setting plaster is desired, crystallized salts are employed, such as common salt, sodium sulphate, sodium carbonate, etc.

Gypsum is used for making models of artistic figures by using a paste of 1 part of gypsum and 2½ parts of water, because it produces even the finest details.

Gypsum is also used as a corrective for certain soils and in the pure state, as a loading for paper. Treatment of gypsum with a solution of ghee and a little zinc sulphate yields "stucco" which is used for ornamentation and more slowly but more strongly than gypsum alone. When moistened with a hot solution of alum, gypsum yields alumed gypsum or English cement which is hard like marble.

Marking Ink for Linen.

244 A. K. G., Morar. Wants a recipe for marking ink for linen.

	By parts.
Silver Nitrate	4
Sodium Carbonate	6
Gum Arabic	5
Liquid Ammonia	10
Distilled Water	8
Sapgreen	2

Two separate solutions are first made (1) by disolving silver nitrate in liquid ammonia and (2) soda, gum, and dye in water. The two solutions are then mixed together thoroughly.

Fast Blue and Green.

439 K. S. M., Chirala. Requests us to describe the composition of fast blue and green dyes.

(1) By heating aminozo compounds with aromatic monamines a great number

of blue dye-stuffs are produced, which are known as 'Indulines.' The simplest representative of this group is the soluble induline which is formed by heating amino-azobenzine and aniline hydrochloride in alcoholic solution under pressure to 160° C. The other indulines are derivatives of this compound and are sparingly soluble in water.

The indulines are marked by great fastness to light and soap.

(2) A fast green dye is prepared as follows. By heating metanitrobenzaldehyde with dimethyl-aniline, nitromalachite-green is prepared ; this compound is reduced, the amino group of amino-leucomalachite-green thus formed is benzylated, and the product sulphonated and oxidised to form the colouring matter.

Coal Products.

209 U. T. M. C., Baran. Requests us to point out the difference between coal tar, tar oil, and crude cresote.

When coal is strongly heated in a retort from the outside, the high temperature to which the vessel is exposed decomposes the coal inside into coal gas, coal tar, ammoniacal water and cake. The amount of tar obtained from a ton of coal varies approximately between ten and twelve gallons.

This "coal tar" is an almost black oily liquid which varies in its viscidity, specific gravity and composition, according to the type of retort employed ; the temperature attained and the variety of coal carbonised.

Again when coal tar, in its turn is subjected to destructive distillation, a very large number of chemical compounds are obtained the number of which approximate two hundred. For this purpose the tar is heated in a closed vessel provided with a small outlet pipe through a range of high temperatures which brings about a splitting up of many of its ingredients into lighter and more volatile ones. It yields at different stages of this fractional distillation the following products in order : Ammoniacal liquor, crude naphtha, light oil, carbolic oil, creosote oil, anthracene oil, pitch. The whole group of Benzol, light oil, middle oil, naphthalene and heavy oil is collectively known as "Tar Oils."

The term creosote is used very broadly in the commercial world and under it are often included oil-gas tar creosote, wood tar creosote, coke oven creosote, blast-furnace oil creosote, and several others. By "crude creosote" we mean coal-tar creosote only. This is employed in the manufacture of disinfecting fluids.

Grinding Barytes.

24 P. C. G., Calcutta. Requires some hints on grinding Barytes for mixing with paints.

Enormous quantities of barytes are consumed in the manufacture of certain grades of paint. In selecting barytes for admixture with white lead or other white pigment special attention should, in the first place, be directed to the colour of the sample, not only in the dry state but also when rubbed down in refined linseed oil. The uniformity of the powdering is the second important point, and the third is the behaviour of the barytes when actually ground in oil. The finest grades of white barytes require pratically the same proportion of oil for grinding as whitelead, while the lower grades require larger proportions of oil. Usually paint containing an appreciable proportion of barytes tends to become soft when kept. The state of sub division of the particles of barytes is the factor which affects it most. It has been found that it is an advantage not to have the powder in too impalpable a state. When the particles of barytes are sufficiently large to enable the rollers to get hold of them, they are ground into the lead better. Consequently the properties of the latter eclipse those of the former, to the advantage of the paint.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of INDUSTRY are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post]

301 M. R. I, Maymyo. Scientific American, New York, U. S. A, is a journal devoted to science and industry. Der Spinner and Weber, Leipzig and Papierzeitung, Berlin deal with industrial subjects.

303 R. K. C, Berhampur. Swa-ai papers may be had of Karam ossain, 13 Patwar Bagan, Lane, lcutta.

306 S. B. P., Nagpur. To start poultry farm you should be familiar with the pros and cons of the business. For that purpose you may go through Poultry Keeping in India by Isa Tweed to be had of Messrs Thacker Spink & Co, 3 Esplanade East, Calcutta.

305 S. P. B.. Multan. Cinema films may be had of Pathe Cinema Ltd, Pathe Building, Ballard Estate, Bombay.

314 Y. J., Tinnevelly. Yarns of all sorts may be had of East and West Trading Co, 16 Bonfield's Lane and E. B. Bros & Co, 11 Dharamtala Street; both of Calcutta.

315 A. A. B., Meerut. Directory of Swadeshi Goods in India is out of print.

316 M. S. A., Kallidaikurichi. Apparatus for extracting lemon grass oil may be had of Bengal Scientific Supplies Co, 29 & 30 College Street Market, Calcutta.

317 G. G. G., NagpurCity. Pipeclay may be had of Arjun Ladha, Chaibassa, Singbhoom. Various kinds of ingredients are used for manufacturing purposes, some of them are chemicals, some minerals and others botanical drugs hence these are not available at one shop only. Dictionary giving the Marathi equivalents of all chemicals and minerals, etc. is not known to us.

318 M. R. S., Mhow; P. Mukherjee & Co, 29 & 30 College Street Market, Calcutta; Bengal Chemical & Pharmaceutical Works Ltd, 15 College Square, Calcutta; H Bose, 61 Bowbazar Street, Calcutta, and D. G. Gore, Sayana Bldg, Lohar Street, Bombay deal in perfumery. Formulas of rose water and otto of roses appeared in July 1923 issue of INDUSTRY.

320 S. B. S. M. S, Rohtak. Reel making machine may be had of Messrs Bros Partner, 35 Ezra Street, Calcutta. Yarns may be had of East and West Trading Co, 16 Bonfield's Lane, Calcutta.

321 S. S. A., Delhi. An article on pearl trade of Ceylon and S. India will appear in the next issue of COMMERCIAL INDIA.

325 M. L. Karnal. It would appear that hair oil of good quality cannot be prepared with mustard oil as base, first on account of its pungent odour and secondly because it possesses no property congenial to the nurture of the hair. Worn out enamels cannot be effectively repaired as in the course of fusing the raw material covering the injured spots, the remaining portions will also get fused. A formula for preparing creosote appears elsewhere.

326 H. M. N., Porbandar. Swedish matches are exported by A-B Laurin & Perkal, Stora Vattug 10. Stockholm and Hedin Ernst, Kaptenog 13; both of Sweden. Japanese matches may be supplied by Adachi T. N. Kaisha, 143 Nishi-machi, Kobe; The British Trading Co., 15 Ginza Nichome, Kaybashi-ku, Tokyo and Chugai Shoke Kabushiki Kaisha, Tosabori, Osaka; all of Japan. Formula of soap appeared in October 1923 issue of INDUSTRY, Articles

on rubber stamp making appeared in January and March issues of 1924.

329 K. S. B., Karachi. An article on incandescent gas mantles appeared in February, 1922 issue of INDUSTRY. Process of block making will be found in February 1923 issue of INDUSTRY. There are large number of institutions in Italy for teaching fine arts, some of which follow : (1) Superior School of Art Applied to Industry, Milan : (2) Industrial Art Museum, Naples and (3) Industrial Art Museum, Rome. Can supply beeswax and honey.

334 B. N. B., Gaya. Stationery articles are imported by Nilmoney Halder & Sons, 206 Radhabazar Street, Calcutta. Electrical goods are imported by W. Leslie & Co, 19 Chowringhee Road, Calcutta. Umbrellas are imported by Tejpal Bredhi Chand, 71, Armenian Street and Manjiram Pannalal, Armenian Street ; both of Calcutta.

336 K. N. B., Rewari. Cape Copper Co. Ltd., Rakha, Singbhoom do business in copper.

337 D. P. S. S., Nawabganj. Wants to be put in touch with manufacturer of red lamp cigarettes.

338 D. K. G , Madras. For *lungis* please enquire of Messrs K. M. Mohamed Natter Sahib & Co., 43, Arab St , MohLee & Co., 41, North Canal Road and H. S. M. Yoosuf & Co , 24, Kling Street ; all of Singapore. Alizarine dyes may be had of Messrs Aminchand Mehra & Sons, 34, Armenian Street, Calcutta.

339 N. A., Guntakal. No apparatus other than hydrometers (Beaume's or Twaddle's) is available for ascertaining the consistency of soda lye.

340 B. R. S., Jubbulpore. Appliances for bee-keeping may be had of E. Plumer & Co , Simla, India and T. J. Baldwin, The Apiary, Bramley, Kent. There is an association called Bee-keepers' Association, Simla, India and another in England called British Bee-Keepers' Association, 23, Bedford St., Strand, London.

341 A. R, K., Chanda. German novelties are imported by Mahomedbhoy Jivabhoy & Co., Nizam Street, Bomay, 9. Blocks of various sizes may be had of The Calcutta Chromotype Co., 52-8, Bowbazar Street, Calcutta.

342 E. B., Jubbulpore. You may go through Indian Agricultural Journal to be had of Messrs Thacker Spink & Co., 3, Esplanade East, Calcutta. You may go through Pitman's Theory and Practice of Commerce to be had of Kamala Book Depot Ltd., 15, College Square, Calcutta. You should invest your money in some profitable concern.

343 C. S. N. A., Madras. Please supply us your quotation.

344 R. T. R., Azamgarh. Silk yarn may be had of Messrs Garg & Co., Azamgarh and Benares Silk Mnfg. Co., Benares Cantt.

345 M. L. D., Amritsar. It is extremely difficult to ascertain the ingredients of the German fire works you have mentioned. However we are consulting with experts and chemists and the result will be made known in due course.

351 N. N. V. J., Rajahmundry. For ice making machines enquire of Messrs Burn & Co., 7, Hastings Street, Calcutta.

353 B. R. B., Bilaspur. For looms required please enquire of Indo-Swiss Trading Co., 27, Pollock Street, and B. D., Bery & Co., 43, Ripon Street ; both of Calcutta. Wants to be put in touch with dealers in moulds. Formula of caustic soda appears elsewhere in the current issue.

354 A. G. P , Sangli. Please add some adhesive as gum solution to your lemon drops.

357 M. T. T., Akyab. Printing machines may be had of Ashutosh Auddy & Co., 16, Lower Chitpur Road and K. Bannerjee, 133, Canning Street ; both of Calcutta. For blocks enquire of Bharatbarsa Halftone Works, 201, Cornwallis Street, Calcutta. American journals may be had of Messrs Thacker Spink & Co , 3, Esplanade East, Calcutta.

358 R. C. S., Hinganghat. Sewing machines may be supplied by H. Ablers & Berg G. m. b. H., Kiel, Germany ; Harmann Beir & Co., Karlstrasse 24, Karlsruhe, Germany and A. G. Mason Mfg. Co., Cleveland, Ohio, U. S. A.

359 S. G. H. D., Bangalore. For patenting your article you may write to the Controller of Patents and Designs, 1, Council House Street, Calcutta. Patent Office Handbook which contains the Indian Patent and Designs Act 1910 may be had of Indian Institute of Science, Bangalore. Lead foil may be had of B. K. Paul & Co, Bonfield's Lane, Calcutta

361 G. C. S, Monghyr. Sewing thread may be had of Natomal Chellaram, 828, Marriot Road, Karachi.

362 B. A, Madras. Divi-divi is used both by dyers and tanners as an astringent, but it contains more tanning than colouring matter. In dyeing with divi-divi fragments adhere to the textile which act as resists and produce a mottled condition of the dyed surface.

364 M. L, Bundi. No such soap is known to us.

366 K. S, Salur. Corundum is in great request for grinding and polishing machinery, plate glass, pebbles, etc.

367 C. L. B. C., Cuddalore. Matches may be bought of B. M. Start & Co., 133, Canning Street ; H. Rashid & Co. 15, Zakariah Street and Lalchand Brothers, Match Depot, 33A, Central Avenue ; all of Calcutta.

368 R. V., Pandicherry. Coal may be bought of Messrs Dutt, Bose & Co., 7, Swallow Lane and Jharia Kanigunge Coal Co., 7, Swallow Lane ; both of Calcutta. Lubricating oil may be had of Shaw Wallace & Co., Post Box 70, Calcutta. For wheat flour enquire of Messrs Kassim Ismail 7 Royal Exchange Place, Calcutta. Cotton may be had of Basantlall Khettry, 185, Harrison Road, Calcutta. Cigarette machines may be had of United Cigarette Machine Co., 59, Holborn Viaduct, London. Cigarette paper of every description may be supplied by The French Cigarette Paper Co. Ltd. 49A. Rectory Grove, Clapham, London S. W. Wishes to buy second-hand The Indian Guide & Directory 1923, Kelly's Director of World Manufacturers for 1923 and A. B. C. Code 5th Edition.

370 B. N. T., Peshawar. Silk piece-goods are manufactured by Abeichi Kabushikikaisha, 2 Chome, Minami-Kyutaro machi, Higashi-ku, Osaka ; G. Akai Shoten, Nishigim Kyoto ; T. Ariga & Co, 17, Nichome, Yokoyamacho, Nihonbashi-ku, Tokyo and The British Trading Co, 15, Ginza Nichome, Kyobashi-ku Tokyo ; all of Japan.

372 No Name, Madura. The following are the service securing agencies of India : G. Mayadass & Co., 119, Frere Road, Fort, Bombay ; Service Securing Agency, 174, Hornby Road, Fort, Bombay ; Employment Bureau, Kirloskar Theatre, Poona City and C. P. Service Securing Agency, Jubbulpore.

374 G. S. R., Guntakal. For books on carpentry please enquire of Messrs. Chakraverty Chatterjee & Co, 15, College Square, Calcutta.

375 D. R. P. R., Rabri. Stationery articles may be supplied by Akino Hattori & Co., 3, Iarisaocho, Kyobashi-ku, Osaka, Japan ; J. C Blair Co., Huntingdon, Pennsylvania, U.S.A. and T. W. Aldesiman & Co, Brett Rd., Hackney, London, E. 8.

377 M. P, Madras. Confectioneries you require may be had of Messrs, Ishwar Chandra Kundu. Dharamtala Street, Calcutta. German novelties are imported by Singh Sarkar & Co., 125, Harrison Road, Calcutta. Stationery articles may be bought of Messrs. Dass & Co., 60, Sikdar Bagan Street. Calcutta.

380 D. R. G, Indore. To secure agencies you must know how to proceed for which purpose you should consult Mercantile and Mail Order Letters and Methods which appeared in February issue of COMMERCIAL INDIA.

381 B. D. C. L., Quetta. Your query is outside the scope of INDUSTRY.

383 V. M. C., Salem. For warping machine enquire of Messrs Bros Partner, 35, Ezra Street, Calcutta.

385 B. N. B, Gaya. You may consult Export and Import Review, 38-39, Krausenstrasse, Berlin, Germany. The address of the 'journal' you require is not known. All sorts of pencils such as lead, copying and coloured are manufactured by Eagle Pencil Co, Ashby Road, Tolthenham, London, E 17. Kelly's Directory may be supplied by Kelly's Directories Ltd, 182-184, High Holborn, London W. C 1.

386 K B. L., Bharatpur. Can supply crushed bones.

387 M. C, Maymyo. Calendars are printed by the Mohila Press, 29, Pataldanga Lane, Calcutta & Calendar Mnfg Co, Bombay No. 2. It will be advisable for you to have calendars printed either in Germany or in America.

388 K. C. K. C., Barisa. Your query is outside the scope of INDUSTRY.

389 C. S. N., Cuttack. To dispose of pigs and hogs please enquire of Eric, 34, Sherrif Lane, Calcutta.

391 P K. L, Jullundur. Hosiery goods are mostly locally consumed.

398 S. B. B, Gwalior. Imported splints and veneers for matches may be had of C. A. Mohamed, 15, Synagogue Street, Calcutta, H. Rashid & Co., 15, Zakariah Street, Calcutta. Chemicals may be had of B. K. Paul & Co., 1-3, Bonfield's Lane and Calcutta Chemical Co. Ltd, 35-1, Panditia Road, Ballygunge; both of Calcutta. For match composition consult an expert.

399 Roll 13789., Alleppey. Please go through the New Idea columns of INDUSTRY.

402 R. N. M, Delhi. You may write to Water Cure Institute, Aminabad, Lucknow.

To Readers of Industry.

Please note that any information in Vegetable Foods, Oils, Soaps, Perfumes and household preparations will be supplied at from 2 as. to Rs. 20 by a 15 years experienced.

INDUSTRIAL CHEMIST.
No 2. Kanmianadu Street, Trichy, S. I.
N.B —Apply for particulars with stamp.

403 C. L, Allahabad. Process of soldering aluminium appeared in August 1921 issue.

405 K. N., Sanand. Formulas of ink powder appeared several times in INDUSTRY.

406 K. C. K. C. T., Rawalpindi. The buckets are usually made of imported galvanised sheets, plain or corrugated. The process of first making the tubes from iron sheets and then galvanising them will be attended with great difficulty.

408 A. M. H., Madras. An article on Boot Polish appeared in June 1923 issue of INDUSTRY. Please consult it. Also to keep wax in pasty condition you must keep it in some solvent.

409 N J. C. C, Amritsar. Watch glasses may be supplied by Nitzsche & Co., Singwitz, Soaly, Germany and Japan Watch Glass Manufacturing Co., 8, Rokuchan Kaigan-dori, Kobe, Japan. Candles are manufactured by Kawahara & Co., 3, Nadanoshima, Kita-ku, Osaka, Japan.

410 G. B., Dhanbad. Glass beads of all descriptions are imported by Messrs Amin Chand Mehra & Sons, 34, Armenian Street, Calcutta. Glass handles for hand bags may be had of D. M. Isaque, 125, North Range, New Market, P. O. Dharamtola, Calcutta.

411 M. A. B., Moulmein. Deodorising tobacco leaves without mixing any ingredient is not possible.

414 R. S. L., Gaya. Picture post-cards may be had of B. M. Malabari, 3, Nil Madhab Sen Lane, Calcutta.

415 R. C, Bombay. To make large sales of your stove please advertise in some journals and periodicals; Mica may be supplied by J. C. Banerjee, 20, Strand Road, Calcutta.

416 K. C., Poona You may establish business connection with Germany directly. Tariff duties for imported goods are one and the same whether the goods come from Germany or America. German marks have depreciated too much and are very fluctuating. You may appear in commercial examination held from time to time in

commercial centres of India specially Bombay ; of course you will have to take permission to that effect.

417 G. S. P., Trichinopoly. You may consult The Dyeing of Textile Fabrics by Mr. J. J. Hummel.

418 G. G., Masulipatam. Used postage stamps may be had of V. R. Sundararaja Sarma & Co., Bhavangadi, Fort Trivandrum, Chelai and A. N. Seshagiri Rao, 282, Lingachetty St., G. T., Madras.

419 A. H., Lashkar. Rubber baloons may be had of Ali Mohomed Akber Ali, 22-1, Lower Chitpur Road, Calcutta. Sulphuric acid is manufactured by The Punjab Chemical Works, Shahdara, Lahore and Sree Radha Krishna Acid Factory, Naulakha, Lahore.

421 M P. C., Karukkampalayam. Tablet making machines may be had of The Calcutta Industries Ltd., 71, Canning Street, Calcutta. First prepare ink powder, then add some adhesive and make tablets in the machine.

422 M. N. K. C., Bombay. Please refer to the last April issue of Industry.

424 K. R. L., Gwalior. The following can be learnt in Germany by Indians : (1) Colour printing, (2) Paper making, (3) Leather tanning, (4) Bone products, (5) Watch making, (6) Umbrella making, (7) Knives and razor, (8) Lens making, (9) Electric bulb making, (10) Motor car and bicycle making, (11) Sugar making (12) Pencil making, (3) Felt making, (14) Aluminium making, (15) Agriculture and forestry and (16) Medicine and dentistry.

425 J. R. S. G., Kalyandrug. About hundred match factories have been started with the Indian machine and most of them are working prosperously. For starting a match factory please go through July 1922 and September 1923 issues of Industry. Thread balling machines may be had of the Oriental Machinery Supplying Agency Ltd, 20-1. Lal Bazar Street, Calcutta.

426 R. K., Minzu. Formula of milk powder appeared in the last issue.

420 D. B D., Bombay. If you wish to sell your articles please advertise in some journals dealing with arts.

431 E. T. A. S., Alleppey. Potteries are manufactured by Calcutta Pottery Works Ltd. 45 Tangra Road, Calcutta ; Gwalior Pottery Works Ltd. 2A Radha Prasad Lane, Sukea Street, Calcutta and Mukherjee's Oriental Fine Art Syndicate, 23 B K. Mukherjee's Street, Uttarpara. Curios may be had of The Oriental Stores, Stall 119, 120 and 121 Hogg Market, Calcutta.

434 M B , Raigarh. An article on gas mantles appeared in February, 1922 issue of Industry. A process of gas mantle manufacture will be found in December, 1923 issue.

436 K. C., Poona. Rubber soles are manufactured by Abel and Block, Fehlandstrasse 46, Hamburg 36 R, Germany. For commercial training by post write to Metropolitan College, Dept. 122 St. Albans, England.

440 I. M. K., Bombay. Formula of bar soap appeared in August, 1921 issue and a good recipe of laundry soap by cold process appears elsewhere in this issue.

441 A M , Bandra. An article on the manufacture of imitation stone will appear in an early issue.

442 T A., Hyderabad. For nickel silver enquire of Syed Abdul Kader, 143-5 Harrison Road and Kaji Abdul Odud, 84 Lower Chitpur Road ; both of Calcutta.

Cheapest House for
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Fine Silver Medals in Velvet lined cases
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Largest Stock & Variety.
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CARR & MAHALANOBIS
CHOWRINGHEE CORNER CALCUTTA.

443 T. R. S. R, Tanjore For soap moulds enquire of Messrs L. B. Verma & Co., Cawnpore.

445 B. P. V, Nova Goa. Cigarettes are manufactured by Naidu Cigarette Co., 79 Howrah Road, Salkia, Howrah,; Messrs Chari & Co., 5 Mission Row, Calcutta and Capital Cigarette Co., of India, 23A Colootola Street, Calcutta.

447 A. M. B. N., Mysore. Your query is outside the scope of INDUSTRY.

448 D. K. M., Burdwan. For motor lorries enquire of Thornycroft Ltd, Diamond Harbour Road, Calcutta. For other enquiries regarding motor car consult a motor mechanic. Profit is generally calculated on output and not on the whole outlay, so please estimate your monthly output, Ice making machines may be had of Messrs Burn & Co, 7 Hastings Street, Calcutta. Yes, you may make bricks in machine but the initial expense will be too much.

450 O. K, Sottiganahatti. Please go through the article on canning in this issue For industrial books enquire of Messrs Chakraverty Chatterjee & Co, Ltd, 15 College Square, Calcutta. Canning machines may be supplied by Spragne Canning Machinery Co., 222 North Wileash Avenue, Chicago, U. S. A. To be enlisted as a student to the Govt. Fruit Preserving Institute, Coonoor write the Director of Industries Madras Can supply karanj oil.

453 A. P. D. E., Madura, We do not deal in anything. Indigo seeds may be had of any seedsmen such as (1) M. Moonisawmy & Sons, Lal Bagh Road, Bangalore, (2) M. Obalappa & Bros, East Main Road, Basavangudi, Bangalore.

454 G A, Jullunder City. The reply to your query will be met with in the articles on construction of a Dry Cell in March issue.

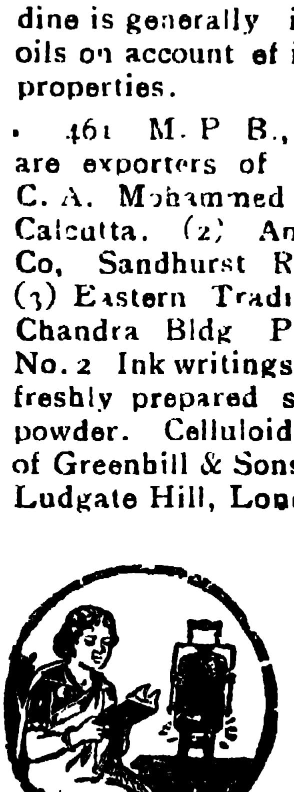
456 K. V S. V., Tinnevelly. A detailed process for the preparation of tobacco like that of Northern India was published in July 1920 issue of INDUSTRY. For detailing apparatus you are referred to Bengal Scientific Supplies Co., 29-30 College St. Market, Calcutta.

457 M. T. T., Rangoon. Your queries are not very explicit. Please address to the Box No of the Correspondence Schools, under care of INDUSTRY when your letters will be duly redirected. No, we cannot supply you sample copies of the magazines mentioned by you. You shall have to write to their respective addresses.

458 S. R. S. P. B., Ellore. A full list of the businessmen of all the countries, you have mentioned, will be found in Kelly's Directory of the World Some of the manufacturers' representatives of this country are (1) London Eastern & American Trading Co., 14, Hummum St, Bombay (2) Indo-Foreign Agency, near Tower, Bunder Rd, Karachi (3) India Co. Ltd., 55, Wallajah Road, Madras.

460 J. A. D., Poona. Journals on paper (1) Paper Making & Paper Selling, 8 Baldwins Gardens, London, E. C. I. (2) Paper Trade Journal, 10 East 39th St, New York, N Y Cantharidine is generally incorporated in hair oils on account of its hair invigorating properties.

461 M. P B., Barh. The following are exporters of Indian produce (1) C. A. Mohammed 15 Synagogue St. Calcutta. (2) Anglo-Indian Trading Co, Sandhurst Road, West Bombay (3) Eastern Trading Syndicate, Ram Chandra Bldg Princess St. Bombay No. 2 Ink writings can be effaced with a freshly prepared solution of bleaching powder. Celluloid sheets may be had of Greenhill & Sons Ltd, 8 Water Lane, Ludgate Hill, London E. C. 4.



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Belgaum, M.S.M. Ry.

462 U. S. D. A., Munnar. There is considerable knowledge of paper-making by hand labour in the following places in India, viz., Cambay, Vijainagar, Kashmir, Nepal, Surat, Burma, etc.

463 S. R. V. M. I., Tuni. It would be advisable for you to consult a match expert with practical training. Isinglass may be had of B. K. Paul & Co, 1-3 Bonfield's Lane, Calcutta and for pyrites you are referred to the Calcutta Mineral Supply Co. 31, Jackson Lane, Calcutta.

465 S. D. N., Delhi. Piece-goods in pieces are imported by Radha Krishna Gobordhan Datta, Armenian Street, Calcutta.

466 R. C., Noakhali. No permanent depilatory recipe is known.

467 D. P. G., Anjar. For silicic acid write to Calcutta Chemical Co, 5 Bonfield's Lane, Calcutta. Bauxite and silicate may be had of the Calcutta Mineral Supply Co, 31 Jackson Lane, Calcutta. To manufacture aluminium bauxite consult Martin's Industrial Chemistry.

469 D. M. T., Berar. The recipe you mention gives a good writing ink. Sodium perborate is quite distinct from sodium bicarbonate. Camphor gum is the same as ordinary camphor and is used medicinally in various diseases. The recipe of ring worm ointment you quote is workable

470 K. S., Kandy. Use a yellow dye to be had of Md. Alibhoy, 41 Armenian Street, Calcutta.

473 R. K. S & Co, Peshawar. Use Kelly's World Directory to be had of all principal book sellers.

475 A. S. B., Ambala. For perfumery essences write Messrs P. Mukherjee & Co., College Street Market Calcutta. The quantity of essence to be added would depend upon its nature and strength. You may go through Soap Industry by A. Watt.

476 J. J. D. P., Ferozepur. To learn banking you may also go in commercial colleges, such as Sydenham College of Commerce, Bombay.

477 U. T. A. G., Thayetmyo. Details regarding the manufture of Papain will be found in an article on the subjected that appeared in April 1920. Any dealer in Chemical such as the Calcutta Chemical Co. Ltd. 5 Bonfield's Lane, Calcutta will dispose of your product. You may ascertain the current price of papain and rectified spirit from the said firm.

478 T. S, Madras. No further particular of the letter is available.

479 B T C, Ferozepur. To bleach bristles wash them thoroughly in a solution of soft soap in tepid water: then rinse them in cold water. Now place them for 2 or 3 days in a saturated aqueous solution of sulphurous acid, work them in clean water and dry them. For bristle making machine write to Oriental Machinery Supply Co, 20-1 Lall Bazar Street, Calcutta.

481 K. V., Hindupur. Kerosine oil may be bought of Shaw Wallace & Co., Bankshall Street, Calcutta.

482 P. G. B., Barisha. The oil mill to be lucrative must at least be bullock driven. Enquire of Messrs. Ghatak & Co., Behala, Calcutta.

483 U. P Moradabad. Glass phials may be had of C. K. Das & Sons, 17, College Street, Calcutta.

484 S. C, Burdwan. Method of preparing soda lye appeared in August 1922 issue.

487 M. H. K., Ludhiana. For machinery write to Oriental Machinery Supply Co, 20-1, Lal Bazar Street, Calcutta.

488 P. T., Calcutta. Try the big stationers at Calcutta.

489 M. V. S, Bangalore. We do not think there is any big chrome tannery in China.

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A comprehensive and Confidential Treatise. Every parent desiring to regulate the number of children according to his health and 'means' will find it a god send, ask for table of detailed contents which will be sent free. K M. DASS & CO., 29-1, Telepara, Sampooker St., Calcutta.

491 S. S. H. D., Bangalore. For lead foil try Messrs. William Jacks & Co, 2 Lal Bazar Street, Calcutta.

493 B. R. D. O., Poona. Soap moulds may be bought of Calcutta Industries Ltd, 71, Canning Street, Calcutta.

494 S. B., Trivandrum. For poultry keeping read. 'Poultry Farming' ,by Isa Tweed.

495 R. S. C., Dongargarh. There is no such easy process.

496 M. P. T., Myaungmya. The exact proportion of chemicals is not known. For mantle making try February 1922 issue of INDUSTRY.

497 V. A, Jamshedpur. For the articles you mention enquire of Pioneer Toy Mart, Old China Bazar Street, Calcutta.

498 S A., Warangal. You are referred to November 1922 issue of INDUSTRY for inks. Your enquiry is engaging our attention.

501 A. P S., Lahore. One must learn moulding from an artist.

502 M. B. T., Pegu. Home Rubber Stamp making apparatus may be bought of B. K. Dutt & S. C. Dutt & Co., 100, Durga Charan Mitter Street, Calcutta.

503 N. A. S., Colombo. For dynamos write to Metropolitan Vickers Ltd, Hongkong House, Council House Street, Calcutta. Please explain what kind of flag, paper or cloth, you intend to paint.

504 M. H., Nathdurga. Method of preparing catechu appeared in the June, 1922 issue of INDUSTRY. Wants to buy jamanka gond gum of black berry tree Address of radium pill manufacturer is not known.

507 C. A. A., Arrah. We do not stock books, for which write to the book sellers

510 B. Bros., Poona. For learning rubber stamp making please go through Rubber Hand Stamps by T. O' Conor Sloane.

511 L. P., Fyzabad. For aerated water you are referred to March 1923 issue.

513 P. C. V. S. & K., Pedanah. The cloth merchants of Calcutta are: Bulakidas Chhaganlal, 60, Cross Street, Hazarumall Hiralal, 148, Cotton Street; both of Calcutta.

515 B. C. P. V., Goa. For German artificial jewellery, you are referred to the Ubersee Post, Solomonstrasse 10, Lipzieg.

516 T. M. K. P., Nizamabad. For hosieries, collars, ties, etc correspond with Imperial Hosiery, 10, Ram Chand Ghosh Lane; Sharma Bannerjee, 43, Strand Road; both of Calcutta.

519 A. H., Damoh. Preparation of jams and jellies appears elsewhere.

520 M. C. M., Bharatpur. Write to big firms with your proposal regarding the deposits.

521 N. V. C., Tirupathy. Saffron may be had of Md Salam Sadhravi, Grant Road, Bombay; Kashmir Stores, Katra Hari Singh, Amritsar.

526 A. T. Co., Bezwada. For machineries of gold and silver gilding enquire of The Oriental Machinery Supply Co., 20-1, Lal Bazar Street, Calcutta.

527 D. R., Gopalnagar. For recipes of boot polish, you are referred to June, 1923 issue.

528 D. A. B., Malabar. We cannot act as your buying agent.

529 V. B R., Cocanada. For machineries see no. 487.

530 B. G. A., Bombay. For shellac write to Messrs. Moran & Co., Mission Row, Calcutta.

PILES.

internal or external, bleading or blind, recent or chronic, radically cured without any operation by the combined use of—

MOTIWALA'S VEGETABLE

Pile specific Re. 1-4, Pile Ointment Re. 1 Laxative Conserve Re 1 and Tonic of Life for stopping hoemorrhages Rs 3-8. (Post and Packing extra) One out of thousands of unsolicited testimonials is given below :—

Mr. Sardar Prasad Sarkar, Dy. Magistrate and Dy Collector, Rajshahi, Bengal; "I am greatly benefitted by **Motiwala's Pills remedies**"

D. B. MOTIWALA & SON,
Morland Road, Byculla, Bombay.

532 D. B., Sind. Bromide enlargements are undertaken by Monochrome Photo Co. 6, Snowhill, Holborn Viaduct London E. C. 1. For Pear's dictionary try S. K. Lahiri & Co., College Street, Calcutta.

535 P. R. N., Chudai. The wax can be made to dissolve in turpentine.

536 M. P C., Ferozepur. You may correspond with the Association for the Advancement of Scientific Studies in Foreign Countries, 10 Old Post Office St., Calcutta. You may study both B. L. and M. A. in the Calcutta University.

537 R. G. B., Ahmednagar. To prepare ginger essence take ginger, cut fine 1000 parts ; alcohol, 95 per cent. 2500 parts, water 1250 parts, glycerine 250 parts. Digest together for 8 days in a very warm place. Silver nitrate is prepared by acting nitric acid on silver. Please go through our article on enamelling which appeared in May, 1923 issue. Dietitic food will be found in an early issue.

538 S. V. S, Guntakal. Cycle parts are available of S. N. Bhattacherjee, 5, Dharrumtola Street, Calcutta. For Screws, bolts, nuts, etc, write to Messrs Balmer Lawrie & Co., 103 Clive St, Calcutta. Wants to purchase tailors' scissors.

540 S. M. I., Galle. For artificial gems see no 515. Candles are manufactured by Hind Candle Works, Sandhurst Road, Girgaon. Glass beads, and bangles may be had of S. Abdul Aziz, 52, Canning Street, Calcutta ; F. P. Nalladaroo & Co., 50-1, Canning Street Calcutta.

541 B. K. M, Birbhum. Please go through Soap Making by A Watt.

543 S. G. P., U. Burma. For camera lens and reparing and knitting machines write to Indo-Swiss Trading Co., 27, Pollock Street, Calcutta.

545 N. K. S. A., Humma. Wants to be introduced to firms dealing in banana flower.

546 M. A. K., Lucknow. Recipe of varnishing gramophone records is is not known.

547 N. V. R, Rajahmundry. Oxygen gas is available of Light Foot Refrigeration Co., Beliaghata, Calcutta. For ice making machines write to Messrs Burn & Co, 7, Hastings Street, Calcutta.

548 D. H., Surat. The tea merchants of Darjeeling and Assam are : Dilaram Tea Co. Toong, Darjeeling ; R. K. Sarasvati & Co., Gauhati ; S. N. Sonowal Bros. Panitolla, Assam. Wants to be introduced to the potato growers of Farrukhabad.

549 N. C. P., Babola. We give below list of stationers : M. Allabux & Co., Narasinha Mansions, Carnac Road, Bombay ; Das & Co., 60, Shikdar Bagan Street, Calcutta ; Sharma Bannerjee & Co. 43, Strand Road, Calcutta. The following are the book sellers : D. B. Taravorevala & Son, 103, Medows Street, Bombay ; R. Cambray & Co, 9, Hastings Street, Calcutta ; G. A. Nateson & Co., 3 & 4, Sunkurama Chetty Street, Madras.

550 B. A., Mangalore Wants to be put in touch with dealers in Japanese wall mats and cloth labels.

551 K. G. W., Ceylon. Would any of our subscribers inform whether navy cut cigarettes are made of genuine tobacco.

552 I. & T. Co., Bombay. These are a few of the glass factories in India : (1) Bengal Glass Works Ltd., Dum Dum, E. B. Ry : (2) Premier Glass Blowing and Scientific Works, Belgachia Calcutta ; (3) Allahabad Glass Works, Naini, Allahabad ; (4) Ogle Glass Works Oglewadi, Satara; (5) Paisafund Glass Works, Talegaon, Dabhada. Glass melting pots are of two kinds, known as open and closed or covered

Weigh Yourself

After using **Amrita Kunda Salsa with Gold** for only 2 weeks, you will find that your weight has much increased. It **Purifies the blood**, and increases and strengthens the growth of blood by creating blood corpuscle It destroys the **mercurial and syphilitic poison**, Price 1 phial Re. 1. Postage 8 as 3 phial Rs 2-8. Postage 15 as.

Catalogue free on application.
KAVIRAJ DASHAROTHY KAVIRATNA.
Dawn Lane, Hatkhola Post, Calcutta

respectively. For these write to Scientific Supplies Ltd., 29 and 30 College Street Market, Calcutta.

554 R. R. S., Dinga. INDUSTRY will suit you most.

555 E. T., Madras. Wants to be introduced to an artist.

557 B. P., Amraoti. An article on water marking paper appeared already in the May, 1921 issue.

558 S. B. P. R., Mangalore. To exterminate rats use caustic soda near about the holes. An article on bug killing appeared in July, 1923 issue. We cannot venture opinion on the article you mention.

560 D. N., Delhi. Cigar manufacturing was dealt with in the Sept. (1920) issue of INDUSTRY. For learning the art of photo engraving you would do well to consult an artisan in the line.

561 K. V., Hindupur. The following are the salt merchants of India: Sulemani Salt Factory, Palmer Ganj; Gaya Bajrangi Salt Works, Muzaffarpur; Salt General Trading Co. Ltd., Gorakhpur.

562 B. K. D. C., Quetta. Please state exactly what perfumeries you want to manufacture. We would try to supply the recipes you want.

563 S. K H., Dhulia. For colours write to Messrs Aminchand Mehra, 34, Armenian Street, Calcutta.

564 M. G. D & Co., Mhow. To secure buyers you have to advertise regularly in papers. Wants to know the address of Dorcock and Puff Sewing Machines.

565 S. P. K., Bellary. Fireworks are manufactured by Pain James and Sons Ltd., o, St. Marry Ave, London, E. C. 8.; C. T. Brock & Co., 15, White Chapel Road, London, E. 1. Addresses of Chinese fireworks makers are not available. Knitting machines may be bought of Harrison Patent Knitting Machine Co, 48, Upper Break, Manchester.

566 K. S. R., Anantpur. Formulae of amorce ribbons will appear in an early issue of INDUSTRY.

567 A. V. V. R., Sazzapure. Matches are manufactured by: (1) Amrit Match Factory, Bilaspur, Kota; (2) C. A. Latif, 15, Paikpara Road, Calcutta; (3) Prasanna Match Factory Deori, Dacca. Soaps are made by: (1) P. A B. Punjab Soap Factory, 55-8, Canning Street; (2) Indian Soap Co., 64-1, Mechua Bazar Street; (3) Calcutta Soap Works, 15, College Sq., all of Calcutta.

571 B. K. S., Kacher. All your queries are outside the scope of INDUSTRY.

573 R. M. Chittor. For guide books on motor cars, etc, write to Messrs Chakraverty Chatterjee & Co., 15, College Square, Calcutta. For electrical appliances write to W. Leslie & Co., 10, Chowringhee, Calcutta.

574 B. P., Patna. Rubber may be bought of P. S. Michael, 76, Princep Street, Calcutta. For types, etc. communicate with Kar Mazumder & Co., Cornwallis Bldgs., Cornwallis Street, Calcutta.

577 V. P., Narsanda. Citric acid from lemons appeared in the issue of August 1921 of INDUSTRY.

578 S. M. S. C., Bodinayakaner. You consult 'Electrical Novelties' by G. N. Mytu to be had of the author at Kingsway Camp, Delhi.

579 K. M., Berhampur. For glasswares write to Krivanek & Co., Steinschonan, Czechoslovakia. Bangles are exported by (1) S. Komai Glass Manu-

KAMINIA OIL.
(REGISTERED).
Used by all nations for preserving and beautifying the hair & keeping the head cool and brain refreshed. Rs. 1-4 per bottle.
Try It Once.
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facturing Co., 4-Chome, Minami, Honmachi, Higashi-ku, Osaka ; (2) Naniwa Celluloid Industrial Co. Ltd., Abeno, Tennoji, Osaka : (3) Nishiumi Sakujiro Shoten, No. 40, Shichome, Minami-kynhoji-machi, Osaka ; all of Japan.

581 T. R. K., Sangli. Small job works can be done by the machine you refer.

583 A. L. M. K. N , Kumbakonam. Your suggestion is drawing our best attention and an article on the subject will be published shortly.

585 N. K. S. A., Humma. Write to Messrs Chakraverty Chatterjee & Co. Ltd, 15, College Square, Calcutta for the technical books.

587 G. R. S , Punjab. You may consult the Report of the Possibilities of Match Manufacture in Bengal to be had of the Department of Industries, 40-A, Free School Street, Calcutta.

588 T. S. R., Milton. Castor oil and groundnut oil may be purchased of Sewlall Shanker Lall, 26-3, Armenian Street, Calcutta.

589 N. L. & Co., Garhwal. Want to be introduced to the endi silk merchants of Murshidabad.

590 M. L. M , Barisal. Wants to be put in touch with a tea broker in Jalpaiguri. There is no Bengali book on the share market.

592 B. S. M , Hardoi. Recipes of fruit syrups have already appeared in the January 1923 issue of INDUSTRY.

593 N. K. J., Almora. Receipes of mantle making will be found in the February (1922) issue of INDUSTRY. Chemicals may be available of Messrs B. K. Paul & Co , 1-3 Bonfield's Lane, Calcutta. For machine write to the Oriental Machinery Supplying Agency, 20-1, Lal Bazar Street, Calcutta.

595 G. G. Bareilly. For addresses of match manufacturers see No 567.

596 N. V. C , Tirupathy. You may read Palmistry Self-Taught by Mr. R. P. De to be had of Messrs Dey Bros , B. 47, S. S. Hogg Market, Calcutta. To learn commercial subjects you may join Sydenham College of Commerce, Bombay.

597 G C , Guru Kambal. For tea tablets refer to July, 1923 issue.

598 K K , Kharagpur. Artificial glue is vegetable butter, an article on which appeared in November, 1922 issue.

602 P. B. B. S., Salem. Celluloid manufacturing was discussed in October and November, 1922 issues of INDUSTRY, which you may please consult.

603 M. S., Hattore. Canvas may be bought of Messrs Soobashah & Co., 12 Zakariah Street, Calcutta. Eyelets are stocked by Messrs F. N. Gupta, 31 Belliaghata Road, Calcutta. Boot and Shoe laces are available of R. B. Chandra & Co , 70, Bentinck Street, Calcutta. Leather may be had of, Calcutta Industrial Leather Works, 1, Pollock Street, Calcutta. Bhagat Ram Sheoprasad, 26-3, Armenian Street, Calcutta can supply you velvet.

604 K. H. & Son, Mandalay. Sign-plates may be artistically enamelled by Bengal Enamel Works Ltd., 55, Canning Street, Calcutta.

605 A. S. C., Madras. Sulphur may be bought of : Dina Nath Daw & Debendra Nath Daw, 2 Banstola Street and Surendra Nath Daw & Sons, 3, Dayehatta Street ; both of Calcutta. Wants to be introduced to old newspaper exporters of foreign countries.

606 M. M. P., S. India. Pure asafoetida is spplied by Himalayan Stores Kasauli Hills. For moulds for candles try Calcutta Industries Ltd., 71, Canning Street, Calcutta.

Bombay Deshi Oushadhalaya.
Factory and Dispensary.
ASK FOR ANY FEVER
AGUE KILLER.
1 Phial As. 8. Doz. Rs. 5.
and our other popular remedies Can be had everywhere at Cheapest Rate.
PEARL & CO..
Victoria Garden, Bombay.

608 A. T. Co., Karachi. The address of The World Salesman is P. O. Box 223, Yokohama, Japan. The address of Novelty News of U. S. A. is not known. The following are a few of the leading commercial journals of foreign countries : (1) British Trade Review, 113, Caveron Street, London; Commercial America, 34th Street below Spruce, Philadelphia ; Far Eastern Review, 5, Jinku Road, Sanghai, China Swedish Exporter, General Export Association of Sweden, Stockholm ; The Czechoslovak Trade Review, P. O. Box 476, Prague, Czechoslovakia ; Le Lloyd Commercial, 26, Avenue Plasky, Brussels, Belgium ; Nation's Commerce, 506, Little Collin's Street, Melbourne, Australia ; Anglo German Commercial Review, 100 Hopestrasse, Cologne. Germany.

609 K. M. T., Agra. Fancy goods are available of Singh Sirkar & Co., 125, Harrison Road, Calcutta.

610 J. P. J , Pussellawa Printing presses are stocked by K. Banerjee & Co., 133, Canning Street, Calcutta. Types are supplied by Madras Type Foundry, 150 Broadway, Madras.

612 R. P. S., Kalibati. For satti grinding machine write to Oriental Machinery Supply Co., 20-1, Lal Bazar Street, Calcutta.

613 V. S. R., Bellary. For twine and rope making machines and envelope making machines try Oriental Machinery Supply Co., whose address appears above

614 J. M. T., Kankanady. Use such pigments as red oxide, yellow ochre, charcoal dust, etc. for mixing with cement.

615 P. M. U., Dacca. For perfumed hair oil you are referred to April, 1923 issue.

617 N. B. & Co., Bongong. Matches are imported by Messrs B M. Start, 133, Canning Street, Calcutta. Potteries are manufactured by Calcutta Pottery Works. 45, Tangra Road, Calcutta. Cane and bamboo works are made by Bengal Home Industries, 3-A, Hogg Street, Calcutta.

618 B. N. P., Supaul. For thread balling machines see No. 613. Yarns of all kinds are available of Sukdeo Ram Misra, 2-12, Cross Street, Calcutta.

621 M. K. D., Kakailsao. The temperature meant in the November, 1920 issue is in Centigrade, Thermometers are to be had of Bengal Scientific Supply Co , College Street Market, Calcutta. Boric acid will keep milk fresh for 2 to 3 days. Fruits preserved by formalin keep for several days.

622 K. Bros., Lahore. You may go through Scientific America.

623 A. L. K., Banosa. B. K. Paul & Co., Bonfield's Lane, Calcutta may supply you palm oil.

625 C. K., Sattiganahatti. Buy a draft from a bank of the amount, preferably from one having branches in France. America may now be a good market for Indian silk Wants to be introduced to the purchasers of karanj oil. Reeled silk may be in demand in places where silk articles are manufactured, such as in Benares, Murshidabad, etc.

629 U. J. P., Jetalsor. Rolled gold wrist watches may be supplied by Anglo-Swiss Trading Co., Dalhousie Square, Calcutta. German novelties are available at Singh Sirkar & Co., 125, Harrison Road, Calcutta.

630 K. C. & Co , Nagaram. Paper merchants are : Bholanath Datta & Sons, 134, Old China Bazar Street, John Dickinson & Co, 3, Lyon's Range; both of Calcutta. For stationery articles see above. Glass lamps and chimneys are to be had of Satish Chandra Daw & Co., 142-1, Old China Bazar Street, Calcutta. Electrical goods are stocked by Gorio Ltd , 19, Radha Bazar Calcutta.

631 N. S., Sirguja. Recipe of removing ink stains will be found in the November, (1921) issue. Recipe of of washing soap was published in October, 1923 issue. No permanent battery can be made.

633 L. M., Cuttack. Wants addresses of dealers in sal poles, fire wood, etc in Kolaghat, Shalimar, Sealdah, Asansol, Kharagpur, etc.

634 P. C. G., Patna. A recipe of soap making appears elsewhere in this issue.

635 G. B. C., Unassad. For German directory enquire of the Commercial Agent to the German Consulate, 6 Fancy Lane, Calcutta.

636 G. C. M., Calcutta. Process of extraction of gold from copper will appear in an early issue.

637 C. T. N., Vellore. See no 635.

638 N. L. R., Modpram. Messrs Bangsidhar Dutt & Co., 125, Khagraputty Street, Calcutta can supply you vermillion.

640 A. R. S., Civil Lines. You may go through our article on Canning which appears elsewhere. Also read 'Hints on Jelly Making' appearing in the June, 1923 issue. Turkey red oil is used in dyeing wool.

641 P. C. S., Jalpaiguri. COMMERCIAL INDIA way suit you. By cotton shares are meant shares of cotton mills and so on. Exchange opened at such and such means on the opening day the rate was quoted as such. You may correspond with a share broker to buy shares.

643 D. N. S., Delhi. Wants to be introduced to merchants dealing in waste paper, cut pieces of cotton and silk piece-goods and part worn clothes.

644 S. C. G., Amta. Silk knitting yarns are available of E. B. Bros., 11, Dhurrumtola Street, Calcutta.

647 J. S., Rawalpindi. Match making is taught at Lucifer Match Works, 11-A, Rajendra Lala Street, Calcutta.

648 D. P. S., Nawabganj. See. No. 629.

650 K. S., Seringapatam. Your enquiry is outside the scope of INDUSTRY.

653 R. B. S., Gwalior. Negatives which after development by ferrous oxalate are opalescent from oxalate of lime are immersed in the following solutions. Water 100 parts ; oxalate of iron, 2 parts; alum 8 parts. By this the opalescence will be completely cleared and the whites of the negative will remain transparent. Construction of electric battery appeared in February 1924 issue. Mix barium sulphide, powdered quicklime and powdered starch in equal parts. Apply with some water to the part from which the hair is to be removed.

655 H. B S. M., Jamshedpur. For starting a sugar factory on a small scale please see elsewhere in this issue. Sugar machineries may be supplied by Mc Beth Bros, 2 and 4, Hare Street, Calcutta.

657 M. P. G. & Co., Cawnpore. Please refer your query to the Director of Industry, Punjab.

658 C. L. K, Bharatpur. For catalogue of match machine please write to Messrs Ghatak & Co, Rai Bahadur Road, Behala, S. Calcutta. Paper mills cannot be started on a small scale. There are only five or six paper mills in India.

659 B. L. D., Dinlapitiya. Milk cannot be preserved for so long a time until it is converted into condensed milk. For dyes enquire of Messrs. Amin Chand Mehra & Sons, 34, Armenian Street, Calcutta. Soap making may be undertaken on a small scale with an initial capital of Rs. 500. For match making please refer to No. 658.

662 T. D. K., Bastignzan. For vernacular equivalents of chemicals you may consult Anglo-Urdu Directory by Mr. Gianchand Hottchand, P. O. Bhiria, Sind. Vernaculars being various in India it is not possible to give the recipes in all the vernacular languages of India. But if you mention clearly in what particular language you require equivalents, we may try to supply the same.

663 D. R. K. C, Colombo. For chemical please try Messrs. B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta Chemical Co. Ltd, 35-1, Panditia Road, Ballygunge ; both of Calcutta.

664 K. P. A., Sitapur. Informs us that horns are consumed by Sambhal Hatinesarar, Moradabad, U. P, for the manufacture of combs, etc.

666 B. N. P., Supaul. Thread balls may be supplied by Albion Sewing Cotton Co. Ltd., Foundry Mills, Tottenham Hale, London, N. 17. For thread ball making machine enquire of the Oriental Machinery Supplying Agency Ltd., 20-1 Lal Bazar Street, Calcutta. Thread balls may be had of Natooram Chelaram, 823 Marriot Road, Karachi. Young India, a weekly edited by Mahatma Gandhi is published at Chedi Lane, Ahmedabad.

667 B. V. S, Tanjore. Process of deodorising coconut oil appears elsewhere in this issue. Formula of bar soap similar to Sunlight soap appeared in the August, 1921 issue. Mix the perfumes after finishing the boiling, etc.

669 P. A. S., Masulipatam. Picture post cards may be had of B. M. Malabari, 3, Nilmadhab Sen Lane. Calcutta. Blackbird fountain pens are manufactured by Mobic Todd & Co. Ltd. Swan House, 133 & 135, Oxford St. London W. 1. Spectacles may be supplied by Dupaul Young Optical Co., South Bride Massachusetts and Rueff Brothers, New York ; both of U. S. A.

670 R. N., Lyallpur. For cotton press you may try Oriental Machinery Supplying Agency Ltd, 20-1, Lall Bazar Street, Calcutta.

673 K. C. B. R, Gujranwala. Your query is of commercial importance so it should be dealt with in an early issue of COMMERCIAL INDIA, the sister journal ot INDUSTRY. Turmeric is generaly exported to England, Germany and America.

674 D. D. S., Jhang. To secure agency of fancy goods please go through the Sale & Exchange columns of INDUSTRY.

675 C. M., Vizagapatam. Die-stamping is made with the help of a punching machine or by moulding, woodcuts are made by carpenters. Other portion will be dealt with later on.

678 H. R., Calcutta. Rags and waste papers may be utilised in the manufacture of paper. Waste paper is sxported by B. Tarafdar & Co., 126A, Amherst Street, Calcutta. You may use a tablet making machine which may be had of Calcutta Industries Ltd., 71, Canning Street, Calcutta. Chemical may be had of Oriental Industries Ltd., 9, Bonfield's Lane, Calculta. Essential oils for hair oils, may be had of P. Mukherjee & Co., 29 & 30, College Street Market, Calcutta.

680 G. O. M., Calcutta. Your query appears elsewhere in these colums.

682 B. D. B, Bolangiri. Wrinkles in match boxes are due to inefficiency in work.

684 V. R. R. N., Kumbakonam. American Exporter may be had of Messrs Thacker Spink & Co, 3, Esplanade East, Calcutta.

685 V. S., Bezwada. The required ink pots may be had of Calcutta Pottery Works Ltd., 45, Tangra Road and Messrs Parry & Co., 11, Clive Street ; both of Calcutta.

686 A. S. A. M. S., Salem. The required address is not known to us. Yarns may be supplied by East & West Trading Co., 16, Bonfield's Lane and Adamjee Hajee Dawood & Co. Ltd., 55, Canning Street ; both of Calcutta.

688 A. S. Y., Gaya. By fixed salts are meant salts which are not easily volatilized. The property is inherent in the nature of the substance and therefore any salt cannot be made a fixed one by any chemical process.

689 D. P. S., Sultanpur. There is a very good arrangement for teaching electrical and mechanical engineering to Indian student in the Benares Hindu University College. Directory of Technical Institutes in India may be had of Indian Industrial Conference, Amraoti. Your query regarding electroplating

chemical gold is quite uninteligible. It will be advantageous to draw silver wire by hand. You may employ mercerised yarn in making gold thread.

690 M. C. K., Peshawar. Glass bottles may be had of Şatya Charan Paul, 194, Old China Bazar Street and C. K. Dass & Sons 17, College Street; both of Calcutta.

691 A. S. A. C., Ludhiana. For sewing machine of required design you may try Calcutta Sewing Machine Co., 11, Bentinck Street, Calcutta.

693 N. K. M., Egmore. You may write to Mr. S. Gupta, Magic House, Nagpur City for learning magic tricks.

696 C. R. R. M., Bangalore. To communicate with any querist please write to him with number and initials under care of Industry when your letters will be duly redirected.

697 R. N. B., Tezpur. Soda silicate may be had of Calcutta Chemical Co. Ltd., 35-1, Panditia Road, Ballygunge, Calcutta.

698 G. N. B., Hyderabad. Soap stamping implement may be had of L. B. Verma & Co, Cawnpore.

699 J. M. L., Kapurthala. For brass sheet enquire of Messrs Balmer Lawrie & Co., 103, Clive Street, Calcutta. Can supply mother-of-pearl.

700 K. S. M., Salem. Groundnut decorticator may be had of Oriental Machinery Supply Agency Ltd, 20-1, Lal Bazar Street, Calcutta.

701 S. R. M., Bombay. Your query is outside the scope of Industry.

703 G. J., Darbhanga. Medical instrument may be had of B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta. Sugar of milk etc. may be had of B. K. Paul & Co., 1-3, Bonfield's Calcutta and N. K. Mazumdar & Co., 34, Clive St., Calcutta.

706 C. H. S., Ahmedabad. Addresses of used postage stamp dealers appear elsewhere in these columns. There is no retriction for doing philatelic business. For picture post cards you may write to Photochemic, Berlin N113 and Richard Kentel, Kunstanstalt, Lahr, Baden; both of Germany.

708 P. R. S., Madura. Laundry machines may be had of Symington Cox & Co. Ltd., Mercantile Building, Calcutta. For engineering materials enquire of Equitable Trading Co., 2, Portuguese Church Street and Clyde, Engineering Co. Ltd., 6A, Corporation Street; both of Calcutta. An article on hair oil will appear in an early issue of Industry. Boiled linseed oil, bleached, 10 lbs; lead shavings $\frac{1}{2}$ lb; zinc oxide, $2\frac{1}{2}$ lbs; Venetian turpentine, $\frac{1}{4}$ lb. Boil for several hours, then strain and dissolve in the strained composition $2\frac{1}{2}$ lbs. with white gum copai. Remove from the fire, and when partly cold add oil of turpentine (purified), sufficient to bring it to proper consistency. Moisten the cloth thoroughly in benzole and give it a flowing coat of the varnish. Cloth thus treated will be transparent.

709 S J. S. B., Yeotmal. Please refer your query to the Conservator of Forests, Dehra-Dun. There is no Government school for training telegraphy in India.

710 G. N., Badam. Motor Car and accessories are imported by Allen Berry & Co., 24, Park Street, Calcutta; Calcutta Motor & Cycle Co, 54A, Bentinck Street, Calcutta; Advance Motor Co, Chawpati, Sea Face, Bombay and and Automobiles Co. Ltd., 5-12, Queen Road, Bombay.

711 B. G. D., Aden. Industrial chemistry is taught in University College of Science, 93, Upper Circular Rd, Calcutta.

712 C. T. A., Madras. Apply the gull of the scorpion on the part of the body stung by the scorpion.

714 S. N., Kyaikto. Litho printing may be undertaken by Calcutta. Fine Art Cottage, 64A, Dharamtala Street, Calcutta and Apollo Printing Works, 66, Cowasjee Patel Street, Bombay. Formula of nickel plating appeared in June, 1923 issue.

719 D. M. H., Jaela. For magic lanterns you may enquire of Messrs Lawrence & Mayo Ltd., 17, Mount Rd., Madras.

724 R. S. R., Chikvallepur. Mysore Agency, 39-6, Sukea Street, Calcutta deals in all kinds of Mysore products including sandal sticks, etc.

725 S. C. A. J, Bangalore The sample of powder you have sent is simply nigrosine which may be had of Messrs Hansraj Vishram & Co., 13, David Joseph Lane and Amin Chand Mehra & Sons. 34, Armenian Street ; both of Calcutta.

726 R. C. B., Singhjani. The herbs you have mentioned are not indigenous to this country, hence their vernacular equivalent is not known.

730 A. C. G., Calcutta. Formula for keeping co conut oil liquid throughout the year is not known. Wants to be put in touch with dealers in white oil.

731 R. S., Sitapur. Japanese matches may be had of B. M. Start, 133, Canning Street, and H. Rashid & Co., 15, Zakariah Street ; both of Calcutta. Glass bangles may be bought of F. P. Nalladeroo & Co., 50-1, Canning Street, Calcutta and S. Abdul Aziz, 52, Canning Street, Calcutta. Glasswares may be purchased of Messrs Nando Lal Dass & Bros., 194, Old China Bazar Street, Calcutta. For hosiery goods enquire of Messrs D. L. Brij Lal & Co., 193-2, Harrison Road, Calcutta ; Ahmed Ismail Patel & Co., 116-118, Chakla Street, Bombay and Indo-Foreign Agency, near Tower, Bunder Road, Karachi. For German addresses of the firms desiring to open business with India please consult Ubersee Post, 10, Solomonstrasse, Leipzig and Export and Import Review, 38-39, Krausenstrasse, Berlin ; both of Germany.

733 A. B. L, Tuni. Formula of stylo ink appeared in August, 1922 issue. For ink pots enquire of Messrs Parry & Co., 11, Clive Street, Calcutta.

734 K. M. D., Thana. Please refer your queries to the Bengal Box Manufacturing Co, 79, Raja Nobo Kissen Street, Calcutta.

Exhibition at Chandernagore.

The exposition of the local arts and crafts organised by the Probartak Sangha of Chandernagore and held during the middle of May, 1924 was very successful. The most attractive feature of the whole affair was the Bhagirathi Chitrasalah.

Among the exhibits, the Mrinalini Khaddar Bhandar of Chandernagore easily carries of the palm in home-spun produced in their own hand-loom factory. Khadi Parthisthan of 41, Charakdanga Road, Belliaghatta Calcutta is doing much to popularise Khaddar, by disseminating useful information on the culture of cotton, etc and supplying all sorts of appliances required in spinning and weaving.

The Bengal Home Industries Association 3A Hogg St. New Market Calcutta laid emphasis on their large and varied silk fabrics though they hold stock of all the products of Bengal. The famous silk textiles of Murshidabad were displaved by Messrs Chandra Kanta Shah and Lalit Mohan Shah, Chak Islampur, Murshidabad, 151, Baranashi Ghose St. Calcutta. Mr. Hrishikesh De of 2, Cross St, Calcutta. showed a big assortment of brass utensils and Mr. B. C. Roy of 1-3A Beadon Row, Calcutta nib, needle, penholder, etc. Charkas are made by Messrs S. C. Das & Co. of Baidyabati. Nice surgical apparatuses are manufactured by Babu Jitendra Nath Dass, Bura Shiv Tola, P. O. Chinsurah. The following are the products of Chandernagore with the names of their manufacturers: (1) Safety matches by Nandy & Co., Hatkhola (2) Locks by Gour Chand De, Palpara (3) Nut cracker by Surendra Nath Nandi, Khalsheni. (4) Wire safety pin by Pravash Ch. Sett, Barabazar (5) Fish hooks by Promotho Nath De & Nagendra Nath Set both of Bakshirber, Bore. All of Chandernagore. The pocket hooka for travelling purposes was a novelty shown by Santosh Nath Sett, Panchanantola, Chandernagore.

NOTICES AND REVIEWS.

Essence of Vinegar.

The Essence of Vinegar prepared by Messrs Charan Dass & Bros., Civil, Risalpur is of entirely satisfactory quality.

Fountain Pen Ink.

Jain's fountain pen ink is endowed with all the desirable qualities of fluidity and constancy. It may be had of the Jain's Ink Depot, 55, Bridge Road, Bangalore,

Tooth Paste

We acknowledge receipt of two kinds Baroline tooth paste prepared by Mr. N. C. Barory, Rajbari E. B. Ry. One contains thymol and the other free-iodine.

Excelsior Inida.

Published from the Excelsior India Office, Diana Flat, Lamington Road, Bombay, No. 7. Quarterly magazine, Annual Subscription Rs. 4 only.

Judging from the inaugural issue lying on our table the magazine promises a distinctive career. There are thought-provoking articles on a variety of subjects, politics and economics, education and religion, sociology and psychology, science and art, etc. A considerable portion is devoted to the Woman's section edited by a cultured lady. We wish the Journal godspeed.

German Stationery.

Messrs Valisam Chabaldas & Bros., Lalwani Street, Hyderabad, Sind have sent us a serviceable blotter and a gumming tube for affixing stamps, both of German make.

Cigarette Paper.

Hand made cigarette papers are offered by Mr. Paro Ram, Mayo Salt Mines, Khewra, Dt. Jhelum, Punjab. They are thin and fine and are intended for rolling cigarettes. He has also made a hand press hectograph.

Hosiery.

The credit for pioneering in hosiery manufacture in this country is claimed by Mr. N. Bose, of 1, Canal East Lane, Belliaghatta, Calcutta. The knit goods of his factory which is said to be the oldest in Bengal, hold their own against foreign products both as regards quality and price. Mr. Bose went to England and Germany to study for himself the knitting art and has now made arrangements for training up apprentices.

For Your Requirements

for machinery and tools for any industry.

Please write to—

KALKAR & CO., Industrial Engineers.
Dadar, Bombay.

Bugshot.

Bugshot is an insecticide manufactured at the Bengal Medicinal Works, 55, Cornwallis Street, Calcutta, with the help of which the troublesome pest may be exterminated.

Calendars.

Our thanks are due to Messrs B. Narayan & Bros., Kacherry Road, Gaya, General Merchants for a beautiful tricolour Calendar.

We have also received a nice Calendar from Bharateeya Tharunamruta Office, Pamidi, Anantapur, manufacturers of patent medicines.

Mining Education.

Bearing in mind that in the years to come the vast mineral resources of India must be increasingly utilized for her industrial development, Indians should train themselves in mining, geology and metallurgy. So long there has been a dearth of suitable educational institutions with advanced courses in these subjects. To remove this desideratum the Benares Hindu University has, with commendable enterprise, opened a special Department for imparting theoretical knowledge as well as giving practical training in these sciences. For practiculars we would refer the Prospectus of the University wherein the whole curriculum is detailed in synopsis.

THE

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MADRAS E.

New Idea Prize Award.

For Vol. XIV (1923-24).

In announcing the Prize Award for the last volume we regret to note that the response to our offer of prizes for the New Ideas for Small Capitalists, Students and Ladies has been far from satisfactory. Though a number of original suggestions have been made they are lacking in details and apparently the trend of our requirements has not been fully comprehended. It is not difficult to throw out hints at random, but an idea to be really useful and serviceable it must be, above all, practical and essentially feasible. Notwithstanding, therefore, that none of the ideas come up to the prescribed standard we declare the following prizes in the hope that during the current volume the competition will be keener and more valuable suggestions may be offered.

The following gentlemen have been awarded a Prize of Rs. 5 only each.

1. Mr. E. Lakkaraju, C/o Ice Factory, Kharagpur.
2. Mr. Bhairam Lal, C/o Messrs Parab Chand Damroo Lal, Narsingpur.
3. Mr. T. Venkatachaly, Trivandrum.
4. Mr. M. V. Shahb, Peerbhoy Building No. 1 2nd floor, Lobarchawl, Kalvadevi, Bombay.

The above winners are requested to apply for their prizes to this office after the June issue is out, citing their roll number.—EDITOR, INDUSTRY.

Trade Enquiries

376 A. A., Dacca. Desires to be put in touch with lungi merchants of Chingleput, Cuddalore and Rangoon.

384 T. & Co., Bombay, Wants to be introduced to dealers in apricot kernel.

393 J. P. G., Aligarh. Is prepared to act as a guide to intending Indian visitor to the British Empire Exhibition.

307 S. C. R., Bally. Enquires who can make spool for typewriter ribbons.

410 G. Bros., Dhanbad. Want to be put in touch with dealers in ivory and glass handles for ladies hand-bags and English silk ribbons.

435 S. N. C., Midnapore. Wants an expert in *tulot* paper making.

449 K. N. A. Asnansol. Wants a knitting expert.

451 K. C. J. & Co., Madras. Wants to be put in touch with dealers in bleached bones.

486 J. O., Calcutta. Wants a soap expert.

508 S. K. B., Calcutta. A biscuit expert with practical experience in a biscuit factory is open to engagement.

522 N. V. S., Bangalore City. An expert in chrome tanning wants service in some factory.

572 R. & Co., Cocanada. Want to be put in touch with dealer in copra in Calcutta and Bombay.

616 E. I., Satara. Wants to be put in touch with dealers in honey and unrefined beeswax.

656 C. S. & Co., Calcutta. Want two capitalists with Rs. 8000 each to invest in a lucrative business.

687 D. B. & Co., Calcutta. Desire to be introduced to dealers in fibres, etc.

702 S. C. D. P, Murshidabad. Can supply Bengal silk yarn in large quantity.

720 Huckauf & Bulle., Borselstrasse 14-18, Altona; Hamburg, Germany. Want an agent in India for their rice-milling machineries.

750 M. D. G., Manbhum. Wants a capitalist to invest in some mining business.

769 S. M., Mambalam. Wants to be put in touch with German manufacturers of B. P. & patent medicines, hardware, etc.

777 N. S I., Ferozepur. A soap expert with practical experience in soap factory is open to engagement.

782 S. M., Calcutta. Wants a capitalist to start an oil mill for producing oil-cakes which can be disposed of at a profit.

Technical articles dealing in industrial manufactures, chemical preparations, etc. are invited from the readers of Industry. Detailed processes accompanied with proper illustrations are desired. Contributions approved of will be suitably paid for.

—Editor, Industry.

June Issue of Industry.

(In the Press)

The June issue of Industry which will appear on the last day of the month will contain a number of informative articles in addition to the regular features such as Formulas, Small Trades, Queries and Answers, etc. Any friend of our subscribers may get a copy free as sample on application to the Manager, Industry, Shambazar, Calcutta.

INDUSTRY

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Industry is published at the end of every month.

Subscribers are enlisted at any time of the year but they will receive only the number from April to March comprising a complete volume for one year's subscription.

At the time of sending a V.P.P. only the current number is generally sent. The previous issues of the volume are sent per book-post on receipt of the value of the V.P.P. For particulars and Advt. rate please write to—

Manager, INDUSTRY OFFICE,
Shambazar, Calcutta.

Managing Editor—Mr. K. M. Banerjee, Vol. XV. No. 171. June. 1924.

MANAGING EDITOR — MR. K. M. BANERJEE.

INDUSTRY
A Journal of Technology Handicrafts & Commerce

Vol. XV. Calcutta, June, 1924 No. 171

Common Sense Wins

IT IS a sound maxim that of telling the truth whenever there is any doubt. By a stretch of imagination we may extend the analogy and say, "Depend upon your common sense whenever you are in any difficulty." In this matter-of-the-fact world everything must be considered from a sensible point of view.. Indeed more is gained by following the dictates of the mind than by paying attention to hair-splitting arguments.

Now there are more fools in this world than wise men, and even in the wise men there is more folly than wisdom. We must not adopt the procedure of persons stuffed with nonsense. They make mistakes at every step resulting in losses, more or less irrevocable. Their lives are full of blunders and failures. We may not emulate persons endowed with uncommon sense. It may be beyond the average capacity to do so. They are gifted with a prescience that enables them to display in each and every case more than ordinary sense, They generally tower above all. We are, therefore, concerned only with persons who can call forth common or "sensible" sense on necessary occasions. Their mind is not obsessed with any prepossession; their ideas are remarkably free from any bias. They arrive at any decision simply on its merit and stick to it. It is they who succeed in the struggle in the different walks.

To every question there is a good aspect and a bad aspect. To grasp the correct import after analysing the situation requires rational outlook. In any sudden problem confronting one there is no time for consultation ; no opportunity for exercising reason ; often it becomes difficult, if not impossible, to weigh its pros and cons. That is the time for the invocation of common sense. And the judgment it delivers is speedy, reliable and rarely fallible.

The secret of success lies in doing the right thing at the right moment and the right thing is determined by common sense. In the long run, therefore, common sense wins the battle of life.

INDIA'S INDUSTRIAL PROGRESS.

Sandal Oil of Mysore.

The two pioneer sandalwood oil refineries working at Bangalore and Mysore City in the Indian State of Mysore utilized 750 tons of sandalwood cut from Mysore forests during 1923. Both factories have made such good progress in the manufacture of a special grade of sandalwood oil suitable for the Japanese trade that this oil has now displaced the German product from that market. The prosperity of this particular oil industry is due to the efforts of the Mysore Government to exploit the vast forest resources of sandalwood found in the State and to manufacture a high grade oil suitable for export markets.

Handloom Weaving.

The Department of Industries, Madras has issued a pamphlet on handloom weaving in the Presidency. It contains a survey of the industry and the main problems so far dealt with by the Department. Praiseworthy endeavours are being made to introduce the preparation of warps by power and thus link the handloom weaver with a power factory.

Burma to Aid Industries.

The Government of Burma in the Ministry of Industry has appointed a committee to consider how far the recommendations of the Indian Industrial Commission for the grant of financial assistance by Government for the encouragement of industries should be adopted in Burma and the measures which are necessary for the purpose.

Middle-class Unemployment in Bengal.

The Modern Co-operative Agricultural Association Ltd. has been formed with an influential board of management to deal with middle-class unemployment in Bengal. Briefly, the plan is to organise a central industry in which young men of the middle class shall be able to find industrial employment for a short time each day, spending the rest of the day cultivating a small holding to produce a great deal of their own food in a systematic and organised manner. The registered office of the Association is at 12-1 Old Post Office Street, Calcutta.

Irrigation Projects in C. P.

The Irrigation Department of the Central Provinces Government, has drawn up a comprehensive programme involving an expenditure of nearly 50,000,000 rupees during the next 14 years. The more prominent of the new works contemplated are: (1) the Maniari Apa, and Agar Hap projects in the Bilaspur district; (2) the Katni Nala, and Umrar Nala projects in the Jubbulpore district; (3) the Bori, Ari, and Chichbund projects in the Seoni district; and (4) the Muram Nala project in the Balaghat district. The schemes to be carried out in the Bilaspur district are all works of fairly large size which when completed will irrigate about 300,000 acres. Of the total area of 1,188,153 acres under rice cultivation in the district, only 4.2 per cent is at present irrigated, and the proposed scheme is expected to raise the percentage of the irrigated area to the total rice area to nearly 37 per cent.

Preparation of Pickles.

(*By a Practical Expert.*)

HUNGER is the best sauce—and in lieu of it pickles. They make the dishes palatable when the appetite grows dull. Pickles add a relish to the food which stands second only to expert cooking. Moreover they are invariably requisitioned for when any guest turns up in the family at untimely hours. A prudent housewife therefore keeps them handy. Pickles are always serviceable.

Neither are they very difficult to prepare. Indeed they are made in every household by the female members in their leisure time. Naturally their preparations vary according to locality and taste. Much also depends upon the materials available and the persons to be catered for. This article furnishes certain typical and representative recipes. The procedures indicated are equally applicable in other cases : only that a particular method should be judiciously adopted in a particular case.

Pickles can be made from a great many varieties of vegetables and fruits and with numerous spices but, of course only the best kinds are worth handling. Big, whole, uninjured, fully developed vegetables should be selected and similarly good and wholesome spices must be chosen. The proportion of the ingredients is a variable quantity : it may be adjusted to suit the taste of the user. Some prefer hot chillies, others onion. So that addition or substraction may be made according to the purpose they are intended for. In mentioning sirka only cane-sugar vinegar is intended unless otherwise stated. Lime of the *pati* variety should always be employed.

The essential points of success are : freshness of vegetables, purity of ingredients and cleanliness in manipulation. Specially so as the products are edibles and intended for human consumption : extreme care should therefore be taken to avoid contamination and infection and to make them as much as possible 'untouched, by hand.' The utensil and bottles must be washed clean and dried in the sun.

The pickles are generally ready for the palate after one or two months, during which time the bottles and jars must be intermittently put in the sun. Particular care should be taken during the rainy season to avoid mouldy growth. They should be sunned whenever opportunity is afforded. In extracting pickles from their containers a spoon or ladle should be invariably used. No portion should be left uncovered ; if the preserving medium, oil or vinegar, proves deficient, more of it should be added. When intended for marketting the pickles should be bottled in decent phials or jars ; corked airtight ; sealed hermetically; labelled attractively.

For the convenience of the readers a glossary of vernacular equivalents is appended together with a comparison of Indian and English measures of weight.

MANGO.

(a) PUNGENT.

Green Mangoes	20
Fenugreek	1 ch.
Black cumin seed	½ ch.
White ,,	½ ch.
Salt	4 ch.
Mustard Oil	2½ srs.

Carefully cut open the mangoes from the top so that the two parts are not quite separated but are attached to one another slightly. The opening must be just sufficient to enable to remove the yet tender stones which are scaped and thrown off. Then put the spices mixed together into the opening and sew up the cut top with thread and besmear them with salt. After one day arrange the mangoes thus stuffed in a porcelain jar, pour mustard oil and keep them in the sun once a week for a month.

(b) SWEET.

Green mangoes	20
Mustard rye	1 ch.
Black pepper	2 tola
Fenugreek	2 ,,
Cumin seed (white)	2 ,,
Cumin seed (black)	1 ,,
Turmeric	1 ,,
Salt	3 ,,
Sugar	1 sr.
Sirka	½ sr.

Cut the mangoes into 2 or 4 slices. Then besmear them with salt and mustard paste, keep for a couple of days when a watery juice will come out of them. Now take off the slices, clean them and soak in thick sugar syrup for 24 hrs. Finally keep them in a bottle immersed in vinegar.

RED PEPPER.

Red pepper	1 sr.
Salt	1 ch.
Lime	25
Mangoes (green)	10
Mustard oil	2½ srs.

The peppers must be green and large. Remove their stalks besmear them with salt, soak them in lime juice and keep in the sun for a day. Next cut the mangoes into 4 pieces each, remove the tender stones and put them in a porcelain jar. Pour mustard oil and then immerse the peppers in it. Place the whole in the sun for a week and pack in bottles.

LIME.

Lime (Pati)	200
Red pepper (green)	50

Take half the limes and cut them into halves cross-wise. Extract the juice from the other half of the limes and hold it in an enamel vessel. Immerse the lime halves into the juice together with the red peppers. Place the jar in the sun during the day and in the dew during the night for a fortnight.

JACK-FRUIT.

Jack-fruit	1 (about 2 srs)
Salt	4 ch.
Lime	25 or 30
Mustard oil	2½ srs.

Take an unripe jack-fruit of medium size. Peel off the thorny skin, cut into pieces and throw off the tender seeds. Boil the pieces in water in an earthen vessel until they are soft, but not overcooked. Strain off the water and besmear the pieces with salt and lime juice.

After 48 hours place them in a porcelain jar and pour mustard oil. Place the jar in the sun in the day and in the dews in the night for a fortnight. Finally bottle and cork airtight.

ARUM.

Arum (Ol)	1 (about 2 srs.)
Tamarind leaves	½ sr.
Salt	4 ch.
Lime	20
Mustard oil	2½ sr.

Peel the *ol* and cut into pieces (each about ½ ch). Take about 3 srs. hot water in an iron pan, bring to boil and and throw the pieces of *ol* together with the tamarind leaves. This is added to remove the undesirable irritating qualities of *ol*. Remove when soft, besmear with salt and lime juice and place in the sun for 3 days. Finally put in a porcelain jar and pour mustard oil. Place the jar in the sun occasionally.

POTATO.

Potato	50
Lime	100
Salt	1 ch.
Sirka	1 sr.
Red pepper (green)	50

Peel the potatoes and cut into halves. Boil them in water until soft. Take out, besmear with salt and lime juice and place in the sun for a day. Finally put in a jar and pour sirka.

CARROT.

Carrot	5 srs.
Mustard rye	½ sr.
Salt	6 tola.

Clean the carrots, peel them and cut into pieces. Boil them in water until soft. Take out and besmear with salt and mustard paste. Put in an earthen vessel and cover up with a dish. Place the vessel in the sun for a day and then pour about half seer of hot water into it. Cover up and place in the sun for 5 days.

TURNIP.

Turnip	25
Tamarind (green)	1 sr.
Salt	2 ch.
Sirka	1 sr.

Clean the turnips and cut into four pieces. Boil them in water until soft. Next boil the tamarinds in water and extract the pulp by kneading. Besmear the turnip pieces with this sour pulp together with salt. Put into a stoppered wide-mouthed bottle and pour sirka. Place in the sun for a week and cork airtight.

KARELA.

Karela	25
Fenugreek	1 tola
Cumin seed, (white & black)	1 tola
Green red pepper	½ ch.
Salt	2 ch.
Lime	20
Mustard Oil	2½ srs.

Cut the karelas nearly into halves, remove the seeds, boil them in water until soft. Put a quantity of the spice mixture together with a red pepper into the opening of two pieces held together and then sew them up. They may also be tagged with small wood pieces. Besmear the stuffed karela with salt and lime juice and dry in the sun. When dried put them in a wide-mouthed bottle and pour mustard oil. Place in the sun for a month.

PEACH.

Peach	100
Salt	2 ch.
Lime	20
Sirka	1 sr.
Ginger	2 ch.

Wash the peaches thoroughly in water and wipe in flannel. Put them in a wide-mouthed bottle together with salt, lime juice and ginger pieces (slender). Place in the sun for a week and finally pour sirka and cork airtight.

PEAR.

Pears	25
Salt	2 ch.
Lime	100

Peel the pears and cut each lengthwise into 4 pieces. Soak them in hot brine for one day and then remove. Put in a glass jar and pour lime juice. Place in the sun for 2 days.

OLIVE.

Olive (large)	100
Mustard oil	5 srs.
Salt	4 chs.
Red pepper (green)	4 ,,
Gram	2 ch.

Wash the olives clean. Take water in a pan and place over an oven. When brought to boil, throw the olives and continue heating until they are soft. Take out the olives on a stone or enamel plate, strew over salt and place in the sun for a day. Then put them in a porcelain jar and pour mustard oil together with red peppers. Place in the sun and dew for a fortnight. Close the mouth hermetically. Soaked gram may be added as a relish.

RAISINS.

Raisins	1 seer.
Grape Sirka	1 ,,
Black pepper	1 ch.
Cumin seed (black & white)	1 ch.
Rock salt	3 ch.
Cardamom major	½ ch.
Ginger	4 ch.

First heat the vinegar and when brought to boil throw raisins together with ginger pieces and salt. When the whole thickens, slow down the heat, add the spices in powder form and remove after a while.

DRY DATES.

Khurma	1 sr.
Sirka	4 sr.
Ginger	4 ch.
Salt	2 ch.

Clean the ginger, and cut into slender pieces. Cut the khurmas into four pieces and throw off the stone. Now heat the sirka and when brought to boil throw the ingredients as prepared above. Continue heating and remove when 1 sr. of vinegar is left. Finally bottle, and cork.

KARAMCHA.

Karamcha	1 sr.
Salt	1 ch.
Mustard oil	2½ srs.

Wash the karamchas clear and dry the water. Besmear them in an enamel vessel with salt. Throw out the watery juice that exudes after three days. Then put them in a jar and pour the oil. Place in the sun and in the dew for fifteen days.

GLOSSARY.

Arum (Elephants' foot)—ol.
Cardamom, major—bara elaich.
,, minor—chota elaich.
Carissa caramdas—karamcha, karanja.
Carrot—gajar.
Cumin seed, white—safed jeera.
,, black—kala jeera.
Dry dates—khurma.
Fenugreek—methi.
Ginger—adrack, ada.
Gram—channa, chhola.
Grape—angur.
Jack-fruit—kanthal.
Lime—lebu.
Mango—am.
Momordica charatia—karela.
Mustard rye—rai sarisha, sarson.
Olive—jalpai.
Pear—na pati.
Pepper, red—lanka, mirchi.
,, black—marich.
Potato—alu.
Raisins—kis mis.
Tamarind—tentul.
Turmeric—haldi.
Turnip—salgam.
Vinegar—sirka.

1 sr. = 16 ch. = 32 oz. = 2 lb.

All Right Reserved.

Manufacture of Artificial Silk.

THE idea of producing artificial silk is not by any means a modern one. Reaumur, the French physicist and naturalist, indicated the possibility of its manufacture in 1754. In his memoirs relating to the history of insects he states explicitly : "Silk is only a liquid gum which has been dried ; could we not make silk ourselves with gums and resins ? This idea, which would appear at first sight fanciful, is more promising when examined closely. It has already been proved that it is possible to make varnishes which possess the essential qualities of silk. Chinese lacquers and similar varnishes are unaffected by solvents ; water has no effect on them ; the greatest degrees of heat to which our fabrics are exposed could not change them.

If we had threads of varnish we could make them into fabrics which by their brilliancy and strength, would imitate those of silk, and which would equal them in value, for good varnishes when properly dried have no smell. But how can we draw out these varnishes into threads ? We cannot, perhaps, hope to draw out these threads as fine as those obtained from silk-worms, but this degree of fineness is unnecessary, and it does not seem impossible to make them into threads, perhaps, as fine as natural silk, when we consider to what extent art may be carried."

In the manufacture of artificial silk to-day resort is had to dissolving cellulose (wood-pulp, cotton, ramie, rhea, grass, jute, hemp, straw, etc.) in a proper solvent, until a proper solution is had free from particles or undissolved chemicals. This solution is more or less viscous, and it is forced by means of air-pressure through a very fine hole or orifice; the viscous solution emanating from the orifice corresponds in its thickness to that of the diameter of the hole itself (the thickness of the thread).

The viscous solution is forced into a liquid (depending on the process used) which immediately coagulates or rather congeals the solution into a solid thread. This thread is twisted with a number of other threads in the form of strand, washed in water and chemicals to dispose of the impurities it may contain (such, for instance, as the solvent for the cellulose itself, or other chemicals that may result therefrom). The strand of thread is now wound on a glass or rubber tube or frame, and the thread is dried under tension. When the thread is perfectly dried it will be found to have all characteristics of real silk.

One of the very first processes discovered for the manufacture of artificial silk, employed ordinary collodion (a solution of nitrated cotton, or nitro-cellulose). This was forced through a fine hole or orifice (called the spinnerette) and into a coagulating solution of cold water. In order to reduce the danger of inflammability a great number of inventors employed alkaline hydrosulphides as the coagulating medium. The object was to de-nitrate or rather reduce the nitrate to a less inflammable compound.

The second distinctive process consists in treating cellulose with ordinary caustic soda until it is fully mercerised; the cellulose is thereafter ground to the form of a fine bread-like crumb, then treated with carbon disulphide in a rotating hexagonal tumbler. The resulting compound is then treated with caustic soda solution to form the viscous solution desired. Great technical skill is required to manufacture this compound, and the product is made at a temperature of 5°C. (41°F.). A slight change in the temperature will immediately congeal the viscous solution into a solid opaque mass, which cannot be used again, and must be discarded.

This process is known as the viscous process by its original discoverers. It is by far the cheapest process now in common use. The coagulating solution used for this process is varied. Some workers use alkaline solutions, whereas others use acid solutions. These solutions are of varying degrees in concentrations. After the thread has been squited through the spinnerette, it is treated with alkaline sulphides in order to dissolve out the sulphur (formed as the effect of the carbon disulphide and the other compounds used in the process). It is washed and dried in the usual manner as already described.

Another interesting process utilises the copper-ammonium oxide (Schweitzer's reagent) as the solvent for the cellulose. This latter compound can be made by the reaction of ammonia (in a closed vessel) on copper turnings, and through this solution is pumped a fresh and continuous supply of air ; in time the copper will be found to be completely dissolved.

A mixture of acetic acid, acetic anhydride and sulphuric acid, will dissolve cellulose. On the addition of water to this soultion cellulose acetate will precipitate out in the form of a fine white powder or flake-like form. This is next dried to dispose of the moisture, and when it is completely dried, it is dissolved in a solution of ethyl acetate, acetone, etc. Such solutions are forced through the spinnerettes into alcohol, which is used as the coagulator. It is finished in a similar manner to that already described.

In the place of acetic acid and acetic anhydride, formic acid may be used with good results. In fact, it is much cheaper than the former compound. Cellulose acetate or formate are both expensive procedures, and are not used commercially. The chief advantage of the product is that the threads are more or less incombustible. Furthermore, the cellulose can be brought into solution quickly, this is not the case with the other cellulose solvents.

Liquid Fuel.

TO BURN a liquid successfully it must be finely pulverized, to effect which it must be heated sufficiently to destroy its tenacity and enable the spraying agent, air or steam, to tear it up and disperse it in a fine spray intimately mixed with air. The correct amount of air must be admitted to burn the liquid, and this is one of the advantages of employing air as the atomizing agent. Where sufficient air cannot be introduced with the fuel it must be admitted from below as through grate bars covered with broken bricks. Steam preferably superheated, is undoubtedly the most convenient to employ as the atomizing agent with few exceptions. As with bituminous coal, which, like oil, is a complex hydrocarbon, liquid fuel should be burned in furnaces more or less protected from immediate loss of heat to the boiler surface by means of linings or muffles of fire brick. Liquid fuel, however, is more easy to burn completely than coal, because it can be more intimately mixed with the necessary air.

The construction of the furnace for oil varies with the type of boiler and the class of burner used. It is the most important part of the installation, but until recently has received the least attention by the engineers. It is in the furnace that the proper combustion of the oil must take place. A slight difference in the amount of air admitted may mean a great loss of heat units. It is an easy matter to secure a smokeless fire, but efficiency can only be obtained by having a carefully designed furnace. The interior of a combustion chamber should show a clear white incandescence with little apparent flame and no smoke or unburned gases coming from the chimney.

The required height of chimney for fuel-oil plants is much less than is ordinarily supposed when the boilers are operating at or below their rated capacity, and considerably greater than is usually supposed when there are heavy over-loads. A chimney of undue height will take an excessive quantity of air for combustion and permit an excessive load on the boilers, both resulting in a large waste of fuel. When the chimney height is limited to that necessary for economical air supply at the desired boiler load, the chance will be remote of any serious waste of fuel, either by supplying excessive air, or seriously over-loading the boilers. The chimney is thus an important and inexpensive means of regulating boiler-plants, and an automatic safeguard against careless firing.

There is a considerable difference of opinion regarding the flash-point of the oil to be used. Crude oil is so varied a material according to its source that no rule can be laid down as to its safety or otherwise. Those crude oils which give a large proportion of gasolene and other volatile compounds are not used in their crude form because it is profitable to refine them, the heavier residuum being used as fuel and being much safer. The use of volatile liquids is only undesirable on the score of safety. Again some of the crude oils contain so little of the lighter oils that they are used as fuel in their crude form. The only thing to be noted is that the more highly volatile oils have an element of danger from which the heavy oils are free. The essential conditions of economical burning are, however, (1) an intimate mixture with air in sufficient quantity and (2) a proper conservation of the temperature pending full combustion.

Manufacture of Diastase.

DIASTASE or Amylase is the name given to the enzyme or mixture of enzymes which converts starch and glycogen into maltose. Diastase is very widely distributed in plants and in animals. It is found in blood serving in muscle, liver and pancreas, and particularly in the saliva. Diastase is found very generally in the leaves and twigs, in the germinating seeds, in the bark, in the pollen grains, and in the latex of plants. It occurs in yeast and in most of the mould fungi, the enzyme of Aspergillus oryzae, otherwise known as Taka Diastase being well known on account of its industrial use in the manufacture of the Japanese beverage, koji. Diastase, like all other enzymes, has not been prepared in anything approaching a pure state.

A great variety of methods have been proposed for the preparation of diastase, the majority of these starting from malt. According to O'Sullivan finely ground pale barley malt is saturated with water, adding enough to slightly cover it and 3 to 4 hours as much of the solution as possible is expressed by means of a filter press. After filtering, alcohol is added, as long as a flocculent precipitate forms, the addition being discontinued as soon as the liquid becomes opalescent or milky. The precipitate is collected, washed with alcohol of increasing strength until dehydrated, pressed between cloth and dried in *vacuo* over sulphuric acid.

C. J. Linter directs one part of ground barley malt or of sieved green malt to be digested for twenty-four hours or longer with two parts of 20 per cent alcohol. The solution is then filtered off, and twice, or at most two and a half times its volume of absolute alcohol added, with constant stirring. More than this quantity of alcohol should not be added, or matters, possessed of little diastatic activity, are simultaneously precipitated. The precipitated diastase quickly settles in yellow-white flakes, from which the supernatant liquid is poured off, the precipitate brought on to a filter and the alcoholic fluid removed as quickly as possible. The residue is removed from the filter-paper, placed in a mortar and well triturated with absolute alcohol, again placed on the filter, the alcohol removed and the precipitate washed with absolute alcohol. The precipitate is brought once more into the mortar, triturated with anhydrous ether, placed on the filter, and the ether removed as far as possible by the suction pump, after which the precipitate is dried in a vacuum over sulphuric acid. The abovementioned dehydration of the diastase by alcohol and ether is absolutely necessary in order to obtain the substance in diastase activity. If the dehydration is incomplete, the preparation dries to a tough horny mass, which is only partially soluble, and is possessed of little diastatic activity. By repeated solution in water and reprecipitation by alcohol the enzyme may be entirely freed from carbohydrate matters. The mineral constituents are exceedingly difficult to remove, but can be reduced by analysis to a little less than 5 per cent.

Canning---How It is Done.--III.

CANNING is not a new industry as it may seem to be. It flourished in Egypt some 3000 years before Christ. It was known to our Aryan fathers at the time of "Mahabharat" ; but due to some unknown reasons it was forgotten and lost. In 1831, the first and successful attempt to encourage the revival of this art was made by the French Government, by means of a contest in which all the scientists of the country took part. M. Appert won the prize. He succeeded in finding out a process of hermetically sealing the cans, and preserving all sorts of fruits, vegetables and meat. It is to him and to the French Government that we owe the enjoyments and conveniences of the modern canned foods. Although this industry was revived in France, it has been developed most efficiently, with commercial and economical success in the United States. This industry, unlike others, needs less capital, simple machinery, and mostly unskilled labour. It is a boon to the community, it helps to reduce the pinch of famines, for it helps in the safe deposit of food.

Let us study for a moment the things that are suitable for canned foods, about the demand of these goods in Indian markets, about the possibilities of developing the canning industry in India, and something about the part that raw products of India can play in the foreign markets.

POSSIBILITIES OF DEVELOPMENT.

Canned foods are convenient, you can have upon the shelf and in the store room a large variety of foods, all prepared, needing only to be cut open and heated (and many of them not even heated). When compared with fresh or refrigerated foods, out of season, they are cheaper. They are preserved where grown, fully ripe and in the best of condition, and have neither the wilted, dejected air of so-called fresh foods that have been shipped hundreds of miles, and exposed for sale in the markets ; nor the leathery insipidity of dried foods. Can any of you who cultivate your gardens, grow mangoes, cherries, strawberries, grape-fruit, pears, peaches leechees and pineapple in the same place, or can you eat your fresh peas, string beans, green channa, cauliflower, okra, squash and spinach, except for a few weeks in the year. And yet a shelf when stocked with canned foods will furnish you all these things and more throughout the whole year. In the development of this industry, next to land, labour, and capital, the main item that is worth mentioning is the supply of the fresh foods for canning and demand for the finished products. In this particular case I have considered the supply of a few most popular fruits and vegetables of India, also mention the necessity of preserving them. Take the mango, how many people outside of those who are blessed with the neighbourhood where it is grown, have a chance to get them fresh. At best they are usually a day or two old when they reach the markets out of the mango territory. In regions where the mango crop is abundant, people do not know how to make the best use of them. Twenty five per cent. of the useful crop is wasted, due to the lack of the knowledge of scientific preserving and to careless handling. The remaining seventy five per cent., due to the bad and slow system of transportation, is not properly distributed ; naturally it is overconsumed by the people in the very neighbourhood.

A large part of the mango crop you can see rotting in the gardens or markets. In many cases this overconsumption, in other words a waste, causes a special mango fever : every year thousands of babies and children suffer from this, principally in the districts of Hoshiarpur and Saharanpur, just after the mango season is over. In spite of the abundance of the crop, not even five per cent. is preserved in pickles and jams. Just think how nice it would be if there was a cannery in that mango district, which would take care of all the excess fruit, ripe or unripe. It will save the waste, it will stop overconsumption, and also stop the fever. It will can the fresh, ripe, fruit, make jellies, preserves, jams, pickles and chutnies out of it. If you compare the flavour of this canned fruit with the flavour of a Durbhanga mango, you will bless the name of Appert and the canning industry. Just imagine if there were canneries in the Valleys of Kashmir, Kulu and Chamba, we could enjoy cherries, strawberries, peaches and pears, throughout the year, all over India. We could get cold drinks of raspberry, loganberry, phalsa and anar in the most southern part of Madras to the most eastern in Bengal. If there were canneries we could taste all the year round, the mangoes of Durbhanga, the leechees of Murzaffarpur, and could have an everlasting supply of preserved apples from Kashmir.

Take milk. What great city is there, which sometimes during the year does not find its people anxious about the fresh milk supply—because hot weather sours it—because long travel from point of origin makes bacteria swarm in it—or because it is not uniform in flavour and creaminess. Here canned and evaporated milk helps us. Same is the case as with various vegetables, like peas and green channa.

DEMAND OF CANNED FOODS IN INDIA.

For the benefit of those who may think that the canning industry cannot be successful in India, because there is no demand for canned foods the following statistics are quoted which show the export of canned foods from the United States of America to India for the month of January 1923.

Item	No. Cases
Asparagus	1,991
Corn	119
Soup (Misc.)	231
Tomatoes	562
Beans	400
Peas	269
Miscellaneous Vegetables	53
Cherries	1,838
Peaches	3,927
Pears	4,201
Pineapples	43
Apricots	903
Plums	126
Other Fruits	6,561
Jellies and Jams	658
Condensed Milk	65
Evaporated Milk	13,025
Pickles and Sauce	4,890
Total	25,325

The total amount of 39,862 dollars (Rs. 125,000) is only from the U. S. A. Just think of the biggest part imported from England, Japan, France and Italy. If I am not wrong, the import of canned foods in India, on the whole must range between 70 to 75 lakhs of rupees, a year. Just imagine if there is so much demand for goods of foreign type and flavour, naturally there will be a bigger demand for the foods of the taste of the people, and for the foods familiar In their daily life.

In spite of the wonderful opportunities of its development and its continuous demand in India, there are chances in the foreign markets ; if we could just use the sour apples of Chamba, the storm thrashed mangoes from the various places, and the "Jamans" in the Punjab, we will get a rich yeild of pectin, enough to use at home and export abroad. There is a great demand in the United States for mangoe juice, and still more for the fruit itself, ripe, or unripe. crushed and packed by scientific process, but it needs patience and proper method of introducing it into the markets.

—By MR. SHADI RAM SHARMA,
(Canning Expert)
10814 Fairchild Ave.,
Cleveland, Ohio.

Barley.

POT Barley is barley deprived of its outer skin while pearl barley is barley deprived not only of the skin, but of a portion of the grain leaving merely a small round kernel. Both preparations are made by means of the same kind of mill, but the pearl barley received a greater degree of the grinding process. The grain is kiln dried before it is ground. The simplest form of mill resembles a common flour-mill, with two mill-stones, each about three feet in diameter, one fixed, the other revolving over it. The upper stone has six grooves cut in the lower surface, from the centre to the circumference and a perforation in the centre. It revolves on a vertical axis of iron, the lower point of which moves in a metal cup fixed on an elastic horizontal beam. The upper stone moves parallel to the lower, and so close to it as to rub without crushing the grain which passes between them. The mill is fed by a hopper, through the central opening, as in the common cornmill. The stones work in a cylindrical box or case, the top of which is of wood, with a circular opening corresponding to that of the stones. The circumference of the box is of thin iron plates, punched with numerous holes, the rough surface of which is within, and assists the operation of removing the skin from the barley. Before being placed in the hopper, the barley is slightly moistened with water, and turned two or three times, in order to loosen the skin ; it is then gradually supplied by the hopper to the action of the stones : it enters the grooves in the upper stone, and is whirled round at the rate of two or three hundred revolutions per minute, thus breaking the skin, and strongly rubbing, but not crushing, the grain against the under stone. It is then driven off with considerable force against the grating surface of the cylinder, which together with the current of air produced in the process, completely removes any remaining skin from the grain. From the cylinder it is let out through a square opening, and falls on a sieve, where the naked barley is separated from the bran. The greater parts of the fine particles of barley escape through the holes in the cylinder during the process ; therefore, to avoid waste a cloth is fastened round the cylinder, and guides the meal into a bin below. The mill answers very well for pearl barley but for making pot barley it has some disadvantages.

Suggestions for Match Industry.

IN THE year 1910, Mr. R. S. Troup wrote in his valuable report, namely, the "Prospect of Match Industry in the Indian Empire" :—

"Anyone who has studied the question of match manufacturing in India minutely from all sides, will unhesitatingly answer that India is herself capable of manufacturing every match she requires and that there is a great future, before the match making industry in India."

But this important industry was not developed so long, simply because the price of imported matches was very low. On account of the great European War and Government protective duty, the abnormal low price of imported matches is no longer in the way of developing this industry. Sentiments of the people for country made goods at present is much higher than what was in the year 1910. The present consumption in India is much greater than what it was in 1910. In spite of all these advantages, many gentlemen who started match factories on small scales are not successful in their attempts. For their guidance I give below several practical hints to help them in their enterprises as far as possible.

(a) Selection of Factory Sites :—(i) You should start a factory in a place where labour and living are very cheap, the suitable trees are available in large quantities. (ii). The climate of the place should be healthy and dry. (iii) The drier the climate the more favourable to this industry. (iv) It is better to have the factory, on the river side as it is very convenient to bring the trees on the river.

(b) Trees :—Before starting a factory, it is always better to secure 400 or 500 trees from the local zaminders at low rate. Otherwise it is natural that they will demand abnormal price for those trees. Ripe old trees are not good for this purpose.

(c) Machines :—Try your utmost to get a perfect machine, direct from the manufacturers. Before taking delivery from their workshop, work there, with the prospective machine at least for 15 days continually. Do not rely on the words of the machine manufacturers, as it is not in their self-interest to disclose their own defects. Do not forget to examine every part, all nuts and bolts of the chosen machine carefully. At the time of demonstration, do not forget to cut sticks as well as veneers for outer and inner boxes, with the machine. The machine manufacturer may have a perfect machine for demonstration purposes but you need not have any business with that particular machine. If the machine does not give uniform sticks and veneers for the 15 days when you work at their workshop it is sure then the machine is defective. Do not accept unless and until you are quite satisfied with the machine. Remember always that your success chiefly depends upon three important factors, viz—(a) good machine, (b) reliable formula, (c) pure chemicals. If you have already a defective machine change the parts at once.

(d) MACHINE MANUFACTURERS' FORMULA or book formula for match composition is not reliable. Every business has got some real trade secrets. You cannot expect them disclosed in books. If you manufacture matches according to those formulas, your matches will be quite useless and worthless in the rainy season. Unless your matches are quite damp-proof like imported matches you cannot expect a good demand in the market. Do not buy any formula from so-called experts Learn this practically under a real expert: if possible please take a guarantee from him for your success in your factory.

(e) PURE CHEMICALS :—For commercial purpose it is always better to use cheaper ingredients. But you must be very careful to use pure and reliable chemicals. The quality of your matches depends upon purity of the chemicals used.

(f) DEFECTIVE PRODUCTION :—Always destroy your defective productions. Never put them into the market. If you do so, you will lose your reputation for ever. Your fate is sealed up then. The quality and get-up of your matches must be up to the mark to attract customers. Use decent labels as far as possible.

(g) CREDIT SALE :—Do not sell your production on credit for big profit. It is better to be satisfied with smaller profit on cash sales.

(h) SELF-HELP :—Do not feel any diffidence in working in your factory with your workers. Do not rely always on your servants, who may work for you on your orders. Be sure that they will not take so much interest as you take for your own business.

(i) PRACTICAL TRAINING :—About 90% of failures in business is due to one thing. We start business without securing any experience in that line. Before starting a business, we should learn (i) how to control labour, (ii) how to keep accounts properly. (iii) how to advertise in papers and grant commission to the middlemen to introduce our matches into the market, (iv) how to deal with customers, (v) how to observe economy in business by working in a factory for a month or so. We cannot learn them in schools or colleges. We cannot prosper in business, without patience.

(j) OPPORTUNITY :—Always make the best use of opportunities.

(k) SYSTEM OF WORK :—It is better to engage workers on contract system than on daily wages system.

(l) CONCLUSION :—Some gentlemen are of opinion that we cannot produce good matches in India. But judging from the samples produced by certain factories the quality of country made matches are now quite satisfactory.

By NIKUNJA BEHARY MUKERJEE B. Sc.,
Proprietor and Expert of the Jenapur
Match Factory,
Jenapur P. O , (Cuttack)

To Keep Milk Bacteria-free.

SINCE milk is an ideal medium for bacterial growth great care must be taken to protect it from contamination, writes SCIENTIFIC AMERICAN. The only method of ensuring that disease-producing organism shall not be present, is to prevent the introduction of of any organism whatever, i. e., the milk must be kept sterile.

Most of the organisms found in milk grow best at the temperature of the human body. As the milk leaves the cow the organisms which do gain access to it, begin to multiply rapidly unless checked. The further the milk has to travel the greater the bacterial content when it reaches the consumer.

There are three main ways of keeping down the number of bacteria, viz , by (1) efficient cooling, (2) pasteurisation or sterilisation, and (3) the addition of antiseptics.

The first method is the only really satisfactory one at the present time. In milk kept at freezing point the bacteria will not multiply to any extent for several days, whereas there may be a 14-fold increase in 24 hours in milk kept at 15°C. Of course the cooling will not eliminate disease germs if these have entered the milk already. It should be emphasised that cooling to temperatures far below 0°C. does not kill bacteria.

The second method consists in heating the milk above the thermal death point of the organisms present and thus rendering it sterile. The disadvantage of the method lies in the fact that a temperature sufficient to destroy with certainty all the organisms including spores will bring about chemical changes in the milk, altering its taste, and perhaps destroying vetamines and enzymes valuable in nutrition. Any temperature above 60°C will almost certainly bring about chemical changes .and since spores can only be destroyed at temperatures over 100°C. or by heating to boiling point several times in succession it will be seen that it is almost impossible to obtain unaltered sterile milk by any method of heat treatment.

The third method is bad since a substance capable of destroying bacteria in milk, generally has a harmful effect on human beings and especially on children. Substances commonly added to milk are boric acid, formaldehyde, sodium carbonate, and salicylic acid. Their use merely stifles the bacteria, disguises the true condition of a contaminated milk and puts a premium on uncleanly dairying. Consequently the use of antiseptics and preservatives is prohibited by law.

The soundest method therefore of keeping down the bacterial content of milk is by clean milking and by maintaining the milk at a low temperature during delivery. The milk vessels should be sterilised by scalding before use and they should be kept covered when containing milk The practice of delivering milk in sealed bottles is infinitely preferable to delivery in bulk and the subsequent measuring out of smaller quantities in a dusty atmosphere. Finally the milk must be produced from healthy cows and no one concerned in its production or distribution must be a disease carrier.

Handloom Weaving in Bombay Presidency.

THAT the handloom weaving industry has made much progress appears from the Annual Report of the Department of Industries, Bombay for 1922-23.

HANDLOOM WEAVING —The work of the Department was mainly concentrated on the introduction of the improved fly-shuttle loom and there were working four weaving schools and six weaving demonstrations. In the schools, boys, almost entirely of the weaving class, are taught the use of improved mechanism and a school is kept running in a village until a number of fly-shuttle looms have been adopted by the local weavers or until experience shows that no progress is likely to be made. The weaving demonstrations are conducted by a demonstrator who is posted to a village with two fly-shuttle looms on one of which he works and on the other any weaver wishing to learn the new loom can practise. The number of fly-shuttle looms introduced was : Bhingar 105, Nasik 77, Bagalkot 97, Faizpur 90 and Parola 96. These results are quite satisfactory and the school at Bhingar after just over a year's working had made such progress in the introduction of fly-shuttle looms that it can now be moved elsewhere. Here the example of Ahmednagar where a large number of looms had been introduced last year was of great value and indicates how improved methods can spread from one town to another.

At the beginning of the year, there were weaving demonstrations at Poona and Parola. The Parola demonstration was then removed to Dholka in Gujarat, but there little progress has been made. The Dholka weavers are in a very impoverished condition and entirely in the hands of their sowkars and the Department had no Gujarati demonstrator available to run the demonstration. It is proposed to transfer this demonstration to Bulsar where the condition of the weavers is not so unsatisfactory and where it is intended to appoint a Gujarati man in charge. The Parola demonstration was removed to Dhulia for demonstrating the double box fly-shuttle loom to the weavers there who had requested a demonstration of improved looms. The double box looms were taken up but the local weavers are anxious for still more advanced practice and proposals have been submitted for holding a demonstration of various automatic handlooms there. In the Southern Division, there were weaving demonstrations held at Guledgud and Nalatvad (District Bijapur), Betgeri (District Dharwar), Bailhongal (District Belgaum) and Karad (District Satara). The two last were removed to Manoli (District Belgaum) and Kolevadi (District Satara) in March 1923 while the Nalatvad and Betgeri demonstrations were transferred to Bijapur and Shirol (District Dharwar). A special effort was made to exhibit to the silk weavers of Betgeri, the possibility of weaving silk saris on the fly-shuttle looms, because these weavers were doubtful whether refined work could be done on this loom. The demonstration was quite successful.

The experiment of training agriculturists to take up weaving as a spare time occupation was continued at the village of Hebsur in the Dharwar District. This village had been chosen because the villagers there were already accustomed to weaving 'gudars' or coverings for threshing floors, and in consequence of the school half a dozen agriculturists took up the work of weaving shirtings, saris or similar cloths on fly-shuttle looms during the slack season. As a means of introducing sari and shirting weaving as an agriculturist's spare time occupation, the experiment has not been quite conclusive. It has, however, resulted in a more economical manufacture of 'gudars'. Where the villager can profitably produce 'gudars' on these lines, it is little use expecting him to desert that work for the production of shirtings or saris in his spare time. The school at Hebsur was therefore closed and the experiment is being repeated at Hulkoti where the inhabitants do not habitually use 'gudar' weaving as a spare time occupation.

PREPARATORY PROCESSES.—The sizing and warping machine was still under experiment and after various trials, satisfactory tests were undertaken at Amalsad, the main requirement being that for proper working a man trained in power textile machinery was imperatively needed. A jobber was secured from Ahmedabad and under his care the machine worked very well. The Indian Industrial Exhibition held at Surat in May 1923 gave the Department an opportunity of exhibiting the sizing and warping machine as well as pirn and bobbin winding machines and the fly-shuttle loom. Arrangements were made so that the whole process from the unwinding of cotton from the hanks, sizing warping and weaving on the fly-shuttle loom was exhibited in continuous working. The demonstration excited very considerable interest among the weavers in Surat and visitors from other parts of Gujarat and there was no question that the machine was of practical value. The difficulties in the way of its introduction are, however, the need of a trained man to look after it and the consequent cost of running and the fact that it produces more sized warp than is required for a single weaver. It should be of value, however, for small power or handloom factories where some 12 or 15 looms are employed.

The expenditure on weaving instruction in this Presidency is very small compared with that elsewhere, and it is perhaps sometimes forgotten that the handloom industry is one of the most important in India. Probably in Bombay Presidency, there are some 8,00,000 people who depend wholly or largely on handloom weaving as their means of subsistence. There are 300 places in the Presidency where weaving is carried on with handlooms ranging in number from 20 to 5,000. Even in Bombay city itself, handloom weaving continues despite the competition of the Bombay mills. The introduction of the fly-shuttle loom has made a great difference to the economic status of the weavers who have adopted it. It is calculated that a weaver's output has been increased by about 40 per cent. and while, of course, the lack of imports during the war and the general rise in prices has had its effects in improving his lot, yet it is incontrovertible that where the fly-shuttle loom has taken root in this Presidency, there the condition of the weaver is very different to what it was a few years ago. But it is also clear that to continue to compete with the mill industry, there must be continued improvement and experiment on the handloom. Whether an automatic handloom which will be within the reach of the weaver's pocket and also suitable for his cramped workshop can be economically produced is not at present apparent, but there is every reason that endeavours should be made to produce such a loom. Further, and probably, at the moment, of greater importance is the need for experiment in the preparatory processes of weaving. The ordinary handloom weaver wastes an enormous part of his time in preparing warps on the most primitive methods and of a most uneconomical shortness. Research is urgently needed on the most practicable and cheapest methods of preparing the yarn for the loom. The warping and sizing machine to which reference was made above is not suitable for the ordinary village weaver. It is for this reason among others that a weaving institute is a prime necessity in the Presidency. It cannot, of course, be said that such an institute will solve all, or even any, of the outstanding problems, but the importance of the handloom weaving industry is such and the need for it to take every method it can, to compete with the power loom industry is so great, that a weaving institute could be justified however unsuccessful it might prove.

Ideas for Small Capitalists.

Egg Trade in Chittagong Division.

Mr. N. C. Dasgupta, P. O. Bharadvaj hat, Chittagong, sends us the following :—

Perhaps it is not known to the public that poultry keeping is carried on a very extensive scale throughout the districts of Chittagong, Noakhali and Tipperah. Large quantities of eggs are exported from different centres of this division. A fair idea of the volume of export business can be formed by looking at the following figures which only shows the export from some of the stations of A. B. Ry.

Station	Total export in a year in maunds.
1. Daulatganj	31815
2. Feni	6348
3. Choumuhani	2333
4. Gunabati	2061
5. Akhaurah	1095
6. Dhoom	1090

Besides there are several other stations which export less than one thousand maunds in a year. Another remarkable thing in this connection is that the first four of the above mentioned stations are within 30 miles of the Laksam Junction (A. B. Ry.). Eggs are generally purchased in village hats (Bazar) from Re. 1-4 as. to Re. 1-6 as. per hundred. This will give the reader some idea of the margin of profit that can be obtained by exporting eggs to the Calcutta market.

The method of packing and storage, as followed by the 'Beparis' (or middlemen) at present, leaves much room for improvement. Eggs are obtained in very unclean condition and never washed. They are pickled with lime and put into big earthen ware jars (Jalas). Eggs cannot remain fresh for long under this condition, and then frequent damage is caused by crashing of the fragile jars.

A far better method is followed in Danish Egg Export Association (Dansk Andels Argeksport) where eggs are packed in wooden boxes in which eggs are placed in cardboard partitions provided with square cells, so that each cell receives one egg. These boxes are returnable at very reduced rate like boxes for packing fish. Eggs should be further washed in some disinfecting lotion and carefully dried as soon as obtained from the farmers. This will improve their keeping quality.

I hope some of our youngmen will take to this profitable business. Further information can be obtained from Babu N. K. Bose, Inspector of Industrial Co-operative Societies, Chittagong or from Babu Satish Ch. Dasgupta, Daulatganj, A. B. Ry.

N. B.—Figures relating to the export of eggs have been kindly supplied by the Traffic Manager of the A. B. Ry.

For Self-Supporting Students.

LAVENDER WATER.

Mr. Keki H. Dinshaw. The Retreat, Bhongir, Deccan, Hyderabad. sends us the following:—

Oil of Lavender.	½ dram.
Oil of Orange.	½ dram.
Rose Water.	3 oz.
Rectified Spirit.	3 oz.

Printed labels, bottles, card board boxes, etc.

Method :—Add the oil of lavender to the oil of orange and then shake the contents, then add the rectified spirit and finally place the mixture in a free-from-dust position for one week. Always shake the contents twice a day. After a week add the rose water. As soon as the rose water is added the mixture turns milky. Place the bottle in very warm water until the water turns tepid. Keep the contents for one week more, then you will observe that after filtering through a filter paper the contents take the original pale lilac colour. Fill up the bottles, label them and cork them well. It must be noted that there are different kinds of bottles : (flat, round, oval, square). They are all attractive ones. They would cost the student much. But if common round bottles are used they would serve the purpose very well. They must be 1½ oz. bottles. Get labels printed from a local press with the following :—

Lavender Water. Manufactured in India. For perfect toilet use. Headache cured. Important to travellers in any climate. Contents 1½ oz. Price Annas four only.

N. B. Oil of lavender and oil of orange can be had of any local chemist. Any student with a very small capital may earn his living and can even pay his fees at school. There would be many purchasers for this Lavender Water in school or out of doors. Any perfumer would stock them if allowed a fair commission. I know students who have earned their livlihood and even paid their school fees by following my formula. All the ingredients that are mentioned herein are obtainable at a very reduced prices. Attach a piece of ribbon to the neck of the bottle to make it more attractive.

Magic Pictures.

Pandit K. C. Joshi, China Khan, Almora, U. P., sends the following :—

A student can defray his expenses at least by adopting the following plan. They should buy some sulphuric acid from the chemists in a small bottle Now take 30 oz. of water in a vessel and add to 1½ oz. sulphuric acid to it. Or if the student wishes to prepare in less or greater quantity he should add acid to the water in the proportion of 2 to 1. Water must never be added to the acid as a considerable heat would then be evolved which may subsequently break the bottle. The student should now take any old magazine containing cartoons or any illustrated big catalogue and trace the pictures on thick pieces of paper and fill up the tracing with a clean nib dipped in the solution. If the student knews free-hand drawing he can make good pictures with the solution. Now he should allow the paper to dry without being blotted. When these plain papers will be placed over the burning lamp a good deep black sketch will be produced by the gentle heat.

In order to advertise these things he should distribute a few sample to his school fellows gratis. He should distribute only 10 or 15, then fix the price as he thinks best. These will sell at sight like hot cakes in the market.

Small Trades & Recipes.

Tanning of Skins.

The "lightning" or sulphuric acid process is the quickest and simplest method of tanning goat and other skins. Pour five or six quarts of boiling water over two quarts of bran, and then strain the infusion. Make an equal quantity of salt water by adding to blood-warm water as much as will dissolve. Mix the bran and the salt water, and to each gallon of the mixture (when no more than luke-warm) add an ounce of sulphuric acid. Immerse the skins in the liquor, stirring them occasionally till tanned, which will be in about 20 minutes. When tanned, rinse in cold water, and hang out in a shady place to dry. Pull and stretch them well while drying. By sufficient pulling they can be made quite white. Dry skins should be soaked in water before tanning till they are quite soft, and flesh and all grease should be well cleaned from them.

Artificial Honey.

As is well known, honey, the product of the bee, consists chiefly of grape sugar. In the manufacture of artificial honey, therefore, the raw material, cane.sugar is inverted by usual chemical process. From the syrup so obtained there separates in the cold crystalline scales of grape sugar which differs littlle from honey in nutrient value. The taste and flavour are usually imparted by adding true honey flavouring, and colouring to suit. To inferior grade there is also added some ordinary glucose or even powdered cane-sugar, in order to impart a better consistency.

Emery Wheels.

On account of its great hardness, emery is universally employed for grinding and polishing, and may be had in the form of powder, as emery paper or emery cloth ; and in the form of solid discs, wheels, or bars of various shapes and sizes. In the manufacture of wheels the rock emery is finely pulverised and mixed with some glutinous 'binding material. What is technically known as 'tanite' wheel may be prepared as follows:

75 parts of glue are steeped in water melted by gentle heat, 25 parts tannin dissolved in methyl alcohol being added, and 600 parts of the finely ground emery stirred in and thoroughly incorporated. The mass so obtained is subjected to a pressure in moulds previously heated to 220° F., and then raised to and maintained at about 255.F for some time. Both emery and corundum may be used similarly.

Odourless Depilatory.

Depilatories are generally prepared from sulphides which result evil-smelling products. They are however best and safest for the purpose. An odourless depilatory may be prepared with the help of the following French recipe, but its application over a large space is attended with an amount of risk.

Thallium acetate	0·30 gm.
Zinc Oxide	2·50 ,,
Soft Paraffin	20·00 ,,
Lanolin	5·00 ,,
Rose Water	5·00 ,,

SCIENTIFIC AND INDUSTRIAL TOPICS.

Hardwood from Softwood.

It has been found possible recently to convert softwoods, by pressing, into hardwoods, which present a very good appearance. The industry is based upon the following principles. When a piece of wood is subjected to a uniform high pressure, along with a high temperature, the cell-cavities of the wood are pressed in and the piece decreases largely in volume. The necessary pressure of about 300 atmospheres must, of course, be applied equally on all sides ; and this is best accomplished by using a liquid at the pressure medium. Water is unsuitable, however, for it penetrates into the wood and thereby the pressing effect is lost. A satisfactory medium has been found in asphat, which only just penetrates into the wood, and then forms such a hard layer that further penetration is impossible. Thus treated in Holland the product is known as lignostone.

Counting Atoms.

An instrument which counts atoms audibly has been recently exhibited in Paris by Madame Curie, the famous discoverer of Radium. It announces by means of a loud-speaking telephone the actual disintegration of a bit of the rare element polonium, and for the first time in history people can thus listen to the transmutation of elements. A tiny silvered plate containing a minute amount of polonium is placed under a tube with its aperture at such a distance that about a dozen alpha particles pass through it each second. Polonium, like radium, is constantly breaking up into alpha particles of helium, which travel a distance of about an inch and a half. It lasts as polonium only 202 days, whereas the life of radium before its disintegration is nearly 2300 years. Each particle on penetrating the cube, causes an luminous discharge which acts as a switch, throwing into circuit a minute electric current that actuates the loud speaker of an ordinary wireless valve-receiver. One thus hears the rapid tick-tick caused by the transmutation of polonium into helium. The instrument provides a novel method of counting the alpha particles emitted by radio active bodies.

Quickening Plant Growth.

Some novel methods of forming the growth of plants are described in a recent German magazine. The ether process of Johansen and the warm bath method of Molish for quickening the spring awakening are amongst the long-known ways. The latter is so simple and certain that a bath at a temperature of 95° F. will start the development of deeply-sleeping buds within twelve hours. The new plan of squeezing or pinching the buds was first described by Weber himself two or three years ago. The effect is quite astonishing, and in a warm room the buds immediatelv begin to develop, which unpinched buds fail to do. Even more amazing is the process of Richter, consisting in dipping the buds into concentrated sulphuric acid, then washing thoroughly. Twigs sprout immediately, and development proceeds several weeks in advance of tuat of control specimens. Rontgen process, in which a strong doze of X-Rays is applied, also gives surprizing premature growth. A new forcing bath is a solution of 30 grains of sugar in half a litre of water, with the addition of 20 grains of fresh yeast, and in this bath such twigs as those of elder are allowed to remain twenty-four hours. The forcing effect is remarkable, elder being made to sprout even in the deep sleep of its early dormant period. The mystery surrounding the seedling tricks so often perfomed by the Indian magicians in countrysides thus receives scientific explanation and the sprouting, budding, fructifying, the evolution of the mango stone, say, happening in a couple of hours appears to be within the range of possibility.

Wireless Crystals.

The majority of the crystals sold for wireless purposes consist merely of galena—sulphide of lead. Crystals of galena produced artificially are much more sensitive as detectors than the natural sulphide, due to some physical difference which is not properly understood.

Natural galena can be sensitised in various ways. The simplest method consists in fusion and re-crystallisation. Galena melts at about 1,10° C., so that the fusion may be carried out with the aid of a large Bunsen burner, or even a kichen stove. The natural galena, should be broken up small, placed in a crucible, and covered with a little sulphur in order to prevent oxidation. The lid should be luted on with clay. The temperature of fusion should be maintained for about half an hour, and then the crucible should be allowed to cool down very slowly. By this simple method of re-crystallisation satisfactory crystals may be prepared from insensitive natural galena. Black amorphous sulphide of lead may be bought from any dealer in chemicals, and this powder may be treated in the same way with good result.

Synthetic Marble.

A new process of manufacturing synthetic marble has been devised in which the marble is made by a wet method in place of the fire method. A mixture is made of chloride of calcium and an aqueous solution of sodium carbonate or a mixture of precipated carbonate of lime and sodium chloride solution is heated in autóclaves at a temperature of 300 degrees C. and 24 atmospheres pressure for a period of eight hours. A compact mass is obtained in this manner. The product resembles marble and has the same high lustre. When sodium sulphate is employed in admixture with chloride of calcium a product is obtained which resembles alabaster.

Making Rain to Order.

During the last few years ingenious experimenters have been endeavouring to control rainfall by varied methods. An American has achieved quite a reputation as a rain-maker. He has been at the business with varying success for several years operating mainly at the expense of agriculturists. His method he keeps a close secret, but it appears to consist of discharging certain chemicals into the air from a tank elevated about 30 ft. above the ground.

Of a different kind were efforts recently made in South Africa to produce rain by spraying the clouds with liquid air from aeroplanes manoeuvring above them, but these appear to have been no more successful than experiments in Australia to condense clouds into rain by creating artificial electric currents in their midst by means of captive balloons connected to a generating plant on the ground.

Now comes the announcement from America that successful experiments have been carried out in Ohio by sprinkling "electrified sand" on clouds, from aeroplanes 500 ft. above the clouds, the result being to cause the moisture to condense into rain, and where the clouds were thin, entirely to disperse them. But until these claims are completely substantiated meteorologists are frankly sceptical. The natural forces involved in the phenomena of rain, and the movement, however, slight, of masses of air is so immense that it is inconceivable how their place can be taken by artificially generated energy.

Electricity on the Farm.

For several years past, some remarkably successful experiments in the application of electricity to farming have been conducted by a British farmer who has the advantage of being also a fully qualified electrical engineer. Apart from demonstrating the commercial possibilities of the more obvious applications of electricity to root-cutting, threshing, sheep-shearing, and so forth, this "farming engineer" has devised new applications and new equipment. Many of these new appliances has been shown at one of the principal British Exhibitions, partly as a trade exhibit and partly for the purpose of showing what is being accomplished in "electro-farming". Amongst these exhibits is one showing the electrical 'curing' of a stock of green grass which is thus converted into best hay. A self-contained petrol electric vehicle with an electrically driven threshing machine represents a great advance on the old-fashioned steam tractor with a belt-drive. An electric incubator, in which warm air is circulated by a fan, accomodates 1300 eggs at a time ; and an improved reflector and time switch for electrically-lighted poultry runs, results in 20 or 25 per cent increase in the number of eggs laid by mature birds. Undoubtedly a wide demand will arise for equipment to be used in these and other applications and we are thus privileged to witness the birth of a new industry, in which the engineer will solve the universal labour problem of the farmer and add to his profits in all directions.

FORMULAS, PROCESSES & ANSWERS.

Cotton Seed Oil.

619 M. J. R. I., Kulpatti. Writes. "Please describe how cotton seed oil is extracted."

The cotton seeds are first freed from all dust and dirt by being forced against a screen by means of a blower, so that all the heavy matters fall to the ground. The next step is to clean the seed, which is effected in a machine resembling a cotton gin, only that the teeth engage more intimately in order to remove the adherent cotton. The cleaned seeds are passed into a rotary cylinder containing two dozen circular fixed knives and an equal number of cutters, which divide the seed into very small pieces. The hulls are thus separated from the kernels, forming a valued food for cattle. The kernels are pressed between rollers like those in a cane-sugar mill, when some of the oil runs out. The mass is then put into woollen press bags laid between horse hair cloths covered with riffled leather to enable the oil to flow more freely, and submitted to hydraulic pressure. The bags are exposed to warm pressing for about a quarter of an hour. This exposure suffices to force out all the oil, which collects in a channel, leaving only the dry kernels behind. These constitute the oil-cake of commerce. The oil is thereafter pumped into a tank, and if destined for sale in the crude state is filled into casks without delay. If, however, it is required for industrial application it is clarified and filtered or refined for storage

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Extraction of Chlorophyll.

569 Y. G. P.. Betul. Requests us to describe the process of extracting chlorophyll.

The usual method of extracting chlorophyll from green tissues consists in first steeping the fresh material in hot water to destroy oxidizing enzymes and then extracting the colouring matter by means of warm alcohol. In an alternative method the use is made of dried instead of fresh material, and extraction is effected by shaking with organic solvents (ethyl or methyl alcohol, ether or acetone) in the cold. Willstatter recommends the following processes one under each head. (1) Half a kilo of dried material is spread on a porcelain Buchner funnel in a layer of not more than 4 to 5 cms. thick, and 1.5 litres of solvent are drawn through this layer by means of a filter pump in the course of half an hour. This filtrate, measuring about 0·9 litre, contains from 4·25 to 4 5 grms of chlorophyll. The solvent employed may be either 90 per cent. (aqueous) alcohol or 80 per cent. (aqueous) acetone.

(2) Two and a half kilos of fresh leaves are ground up in a mill and shaken in a bottle with 1·5 litres of acetone to remove water and mucilage and to stop enzyme action. The acetone is then filtered off on a pump, it contains no chlorophyll. The residue is then freed from acetone by filtering on a pump under a pressure of 200 atmospheres, and the resulting hard mass, weighing 0·8 kg., is broken up and ground again. On adding 1·5 liters of acetone the latter becomes diluted to 80 per cent. by the water still remaining in the residue ; the mixture is shaken for 5 minutes and a further quantity of 1 litre of 80 per cent. acetone is now added. The liquid is filtered off on a pump and the residue treated three times with half a litre of 80 per cent. acetone. The total filtrate should measure 3.7 litres and contain 4·7 grams chlorophyll.

A Gum Plaster.

The same gentleman wants recipe for a gum plaster from lead oxide.

A common 'mastic' is prepared as follows. 100 parts of ground stone, 50 parts of silver sand or of fine river sand, and 15 parts of litharge are required. These are all dried and mixed and passed through a fine sieve ; it then resembles fine sand. This mastic may be kept for any length of time in a dry place. When required for use it is gauged with raw and boiled linseed oil (in equal proportions) until of the consistency of fine stuff. It requires long and frequent beating and kneading; in fact, the more it is knocked up the better it works. Its fitness for use can be ascertained by smoothing a portion of the gauge with a trowel. If there are any separate parts of the different materials or bright spots seen the knocking-up must be renewed until it is of even texture. The addition of 15 parts of red lead is sometimes added to increase the tenacity of the mastic.

Patent Textile Soap.

624 A. K. M., Guntur. Asks, "Could you guess what monople soap consists of ?"

Monople soap is a textile soap patented by Stockhausen. The special claim made for it is in respects of its use in place of Turkey-red oils in the dyeing and printing of cotton goods and finishing of textile fabrics. The soap is prepared by heating the sulphonated oil (obtained on treatment of castor oil sulphuric acid) with alkali, and it is stated that the product is not precipitated when used in the dye bath as is ordinary soap, nor is it deposited upon the fibre.

Citric Acid from Lemon.

352 V. P. P., Gujrat, Wants to prepare citric acid from lemons.

Citric acid is specially present in the juice of lemons and limes, and of currants. To obtain it, lime-juice is precipitated with milk of lime, the calcium citrate is decomposed with sulphuric acid, and the solution of citric acid is evaporated down. Citric acid is used as a discharge in tissue printing and in the manufacture of lemonades.

Two Solution Hair Dye.

640 M. A. R., Moradabad. Wants a recipe for two solution hair dye.

(A)	Powdered gallnuts	8 grm.
	Water	10 ,,
	Rose water	10 ,,

Boil the gallnuts with the water. Strain the decoction through close cloth. Mix the rose water. Bottle the solution while still hot. The bottles may be of clear glass.

(B)	Silver nitrate	3 grm.
	Water	20 c. c.

Add sufficient ammonia to redissolve the precipitate formed in the above. Put in a dark bottle.

Dyeing Murcerized Cotton.

505 S. S. G,, Meerut. Requests us to throw some hints on the dyeing of mercerized cotton.

Generally speaking mercerized cotton is dyed with the same colours and in the same way as ordinary cotton. However, the two following reservation are to be noted in this connection.

(1) Owing to the increased affinity for direct cotton colours given to cotton by mercerization, less colour is required to yield the same depth of shade than when dyeing ordinary cotton. Again less assistance is required and more care is expended in manipulating mercerized cotton than is the case with plain cotton ; thus the dyeing is necessarily carried out more slowly coming to practical details, more liquor is usually taken than for ordinary cotton, whilst the temperature is raised more slowly. Light shades are frequently dyed in a soap bath without any other addition, and wrung out and dried without washing. Of course this entails the use of a little more colour.

(2) When the cotton is scrooped after dyeing care must be taken to avoid colours whose shade will be altered by the acid used in the scrooping.

To obtain a scroop on mercerized cotton the goods are worked 10-20 minutes in a cold bath containing 10 per cent soap ; they are then wrung out or hydro-extracted without rinsing, and worked 10 minutes in a cold bath containing 1—1½ oz. acetic acid per gallon.

Gilding Pottery.

575 V. K. P., Trivandrum. Requires hints on gilding pottery.

The common process of decorating pottery with gold is known as "overglaze gilding." The gold, in this case, is employed not in the form of leaf, but in the form of an impalpable powder. For this purpose, the metal is dissolved in *aqua regia*, and precipitated either by a dilute solution of ferrous sulphate or of mercurous nitrate. In both cases a precipitate of metallic gold is formed, and this is separated from the liquid by decanting, washed several times in boiling water and dried at a temperature below 100°C. Gold powder prepared with mercury is more bulky and consequently more economical and more used than that precipitated by the iron salt.

To fix the gold powder, thus obtained, to the ware, it is required to be mixed with a flux. For this purposed solution of bismuth nitrate in nitric acid is employed. This salt being precipitated by water, about half its weight of borax is added to it and the mixture dried, then it is added to the gold powder in the proportion of 1:12 or 1:15. In certain cases, a little borate of lead is added to increase its fusibility.

After being burned the vitrified gold is dull, but may be brightened by burnishing it with burnishers, agate, hemtite or blood stone, or with fine sand. It should always be rubbed in the same direction, so as not to scratch the gilding, and some liquid such as vinegar should be used to make the rubbing softer when burnishers are used. Certain parts may be burnished while others are left dull, so as to obtain contrasting effects.

To Preserve Lemon Juice.

591 R. B., Karachi. Asks how to preserve lemon juice with or without preservatives.

Lemon juice is expressed in England, and also in Sicily, where the method of prepartion is to mix one ounce of brandy with ten ounces of the juice, and over the surface of the liquid to pour a layer of olive oil. This crude process of preservation is effectual, but is now being supplanted by more modern methods.

Among the chemical preservatives now in vogue, may be mentioned, boron in the form of borax or boric acid, or a mixture of both ; sulphites, chiefly the acid sodium and calcium salts ; salicytic acid, etc.

Damp-proof Glues.

517 S. S. R. M. M. Co., Berhampore. Want recipes for damp-proof glues.

(1) Dissolve 4 parts of good glue in 6 parts of methylated spirit, then add 1 part of powdered lime, and stir well.

(2) Mix 5 parts of quick-lime with 1 part of linseed oil. Thoroughly stir the mixture, then heat until quite thick and spread on plates. It will set in a hard mass, and can be malted over a fire like ordinary glue.

(3) Dissolve 12 parts of glue in the same parts of hot water, then add 3 parts of yellow resin and continue the heat until melted ; finally add 4 parts of turpentine, and mix thoroughly together on a water-bath.

Curing Tobacco.

464 S. P. T. & Co., Vizianagram. Want a simple process for curing tobacco.

Curing of tobacco is a very difficult process. The methods adopted vary with the description of tobacco harvested and may be divided into two classes (a) the fermentative and (b) the non-fermentative methods.

The following simple process may however be generally adopted.

The plants are hung up to dry during four or five weeks, taken down out of the sheds in damp weather, for in dry they would be apt to crumble into pieces ; stratified in heaps, covered up, and left to sweat for a week or two, according to their quality and the state of the season, during which time they must be examined frequently, opened up, and turned over, lest they become too hot, take fire, or run into putrefactive fermentation.

Rubber Cement.

586. A. H., Satara. Wants formulas for rubber cement.

Below are given two tried recipes for preparing rubber cements.

(1)	Finely chopped rubber	20
	Powdered Resin	3
	Good shellac	2

The above ingredients, measured by parts, are dissolved in a sufficient quantity of bisulphide of carbon.

(2) Dissolve gradually 15 gr rubber in 2 oz. chloroform. Then add 4 dr mastic in powder form. Allow the mixture to stand by for eight or ten days before using.

Black and Green Ink.

544 S. A., Warangal. Asks for good recipes for black and green ink.

BLACK INK.—Dry tannic acid 23.4 parts; dry gallic acid 7.7 parts; sulphate of iron 30.0 parts; gum 10.0 parts; dilute hydrochloric acid 25.0 parts; phenol (carbolic acid) 1.0 part; water, boiling, 1,000·0 parts. Dissolve the sulphate of iron and gum in boiling water, add the acids, and expose it to the sunlight for 6 hours. Then make up with boiled and cooled water to 1,000 parts. This ink writes pale, but in a few hours turns into an intense black. Dipping in water, or wetting the writing increases the blackness, which is indelible.

GREEN CHROME INK.—Bichromate of potash 10 : hodrochloric acid 10; spirits of wine 10; gum 10; water 30; Mix the bichromate, finely powdered, with the acid and let it stand for an hour. Into the red solution thus obtained, the spirits is slowly poured with constant stirring. The reaction is very vigorous, and the liquid froths and gets very hot, and gradually turns to a dark green. If the action gets too violent a little cold water is put in. To avoid boiling over it is best to add the spirits in portions, waiting till the frothing after each addition is over before adding the next. The next step is to add carbonate of soda till all effervescence has ceased and a greenish precipitate begins to form. The liquid is then left covered for a week, filtered from the salt which has crystallised out, and diluted to the desired colour. Finally, the gum is dissolved in it. This ink penetrates the paper deeply, and gives green writing which is absolutely permanent, and is very difficult to efface.

GREEN INK.—(A) Indigo carmine 120; gum 200; water 3,000. (B) Picric acid 15; boiling water 720. Make solutions, (A) and (B) separately, and then mix them.

Duplicator and its Ink.

843 S. S. G., Jullundhur City. Requests us to give direction for making a Duplicator and its ink.

The duplicator is known as Hectograph. It is a simple appliance with help of which 50 to 100 copies of any written matter of limited size may be easily obtained. The duplicator is thus useful in preparing circular letters, etc.

The body of this copying pad is generally composed of a mixture of baryta, clay, gelatine, etc. kept moist by glycerine and encased in a tin frame

A suitable recipe is

Gelatine	4 lb.
Baryta (in fine powder)	1 ,,
Glycerine	20 ,,
Water,	8 pints.

The baryta may be substituted by kaolin worked with water.

The surface of the duplicator may be freed from ink stains after use by wiping with dilute solution of hydrochloric acid.

Inks.

(1) Violet ink is generally employed for writing the original with. It may be prepared by dissolving 1 oz. of methyl voilet in 9 oz. of hot water acidulated with 30 drops of strong acetic acid.

(2) A red ink for similar use is made by dissolving 2 oz. of rosaniline in 1 oz. of alcohol and diluting the product with 10 oz. of hot water.

The Malting Process.

743 D. H. G., Thana. Wants to learn how malting is carried on.

The general principles of the malting process have been briefly described by Dr. Sykes. Malting consists in the partial germination of raw grain by causing it to imbibe a certain amount of water and by keeping it under proper conditions on a floor or in special drums After germination has proceeded to the desired extent, the rootlets which have developed are allowed to wither ; this happens as a consequence of the loss of moisture by assimilation and by evaporation. The grain is then transferred to the kiln, where it is first dried at a temperature ranging from 80°F. on the first day to say 150°F. on the third day, after which the temperature is raised and the malt cured. The temperature on the third day as well as that at which the curing is conducted depends on the class of malt to be produced. During germination the secretion of diastase and other enzymes takes place, and these acting on various parts of the endosperm furnish the necessary germ food for the growth and respiration which are taking place. At the withering stage the rootlets die off and little or no further growth of the acrospire takes place, for the grain is in a moribund condition ; the diastase and other enzymes, however, which at that time are distributed throughout the whole of the endosperm act upon certain of its contents and produce the condition known as mellowness. This mellowing is completed at the initial stage of the kilning process, whilst at the intermediate and final stages of kilning the restriction of diastase and the production of colour and of specific flavours are brought about.

Assaying of Galena.

485 P. A. S., Kumta. Writes, please suggest how to assay galena.

Galena or lead sulphide, is the chief ore of lead. As it invariably contains more or less silver this metal is always tested for and its amount determined.

Lead ores are easily concentrated by mechanical operations, so that the samples received for assay are generally comparatively pure. To determine the lead weigh up 25 gramms of ores, mix with an equal weight of sodium carbonate and 2 grammes of argol ; place in a crucible, then cover with a sprinkling of sodium carbonate or borax, and insert a piece of hoop iron bent into the shape of an inverted U to reduce the lead sulphide. Place in a furnace heated to, but not above, redness, and cover the crucible. In about twenty minutes the charge will be fused, and when bubbles of gas are no longer being evolved and tranquil fusion has taken place, the iron is withdrawn and any adhering buttons of lead washed off by dipping it a few times in the slag. Cover the crucible, leave it in the furnace for a minute or two longer, and then pour. Detach the slag, when cold, by hammering. and clean by brushing or washing in hot water and weigh. The weight of the button multiplied by 4 gives the percentage of lead.

The silver in argentiferous lead ore may be determined by scorification. In the case take from 5 to 10 grammes of ore, 30 grammes of lead, and 0·5 gramme of borax. Scorify, cupel, and calculate to ounce to the ton.

Paste for Labels on Tin.

651 Illegible, Laskar. Asks for good recipes of paste for labels on tin and varnish for labels.

(A) Dissolve 2 lbs. of brown sugar in 16 fl. oz. boiling water.

(B) Dissolve ½ oz. French gelatine in 4 fl. oz. water.

(C) Beat up 12 oz. corn starch with 12 fl. oz. cold water, and pour the batter into boiling water, 32 fl. oz. Continue boiling until the paste is translucent.

Thoroughly mix A. and B. with C. and the paste is made.

Paste for tin should not be too thin, and the tin should be free from grease. New tin generally has an oily or greasy surface, due to the tallow or oil used in the plating process. The grease may be removed with an alkali or with benzene, but it is better to slightly roughen the surface of the tin where the label is to be placed with a piece of fine sand paper. This paste is very edhesive.

Varnish for Labels.

A good label varnish may be prepared by dissolving 10 oz. of bleached shellac in 4 pints of ether and then adding to the solution 5 oz. of carbonate of lead. The mixture is thoroughly shaken and filtered. For ordinary purposes ether may be substituted by methylated spirit which is cheaper. The varnish is employed for shining up labels of phials, etc.

Artificial Grindstone.

681 L. D., Amritsar. Writes, how can a tool grinder be made ?

A grindstone for sharpening knife edges or polishing steel, etc. may be artificially made as follows. Take 59 parts of glass in fine powder, 22 of rock crystal, 22 of minium, 14 of borax (calcined), 5 of saltpetre and 1 of arsenic. Mix the ingredients thoroughly with water into a paste and mould to the desired shape.

Preserving Milk and Butter.

704 H. L. C., Dacca. Asks, what are the preservatives generally used for keeping milk and butter ?

The practice of adding preservatives to foodstuff is considered by many to be highly reprehensible, while others are warmly in favour of this course. In order to check the growth of micro-organisms in milk, and thus make it keep for a longer time than it otherwise would, preservatives are frequently added. The most common additions for this purpose are boric acid and its sodium salt, borax ; salicylic acid, either alone or mixed with borax and boric acid, and sometimes in alcohol or glycerol solution ; fluorides, such as sodium fluoride or potassium acid fluoride ; fluosilicates, and fluoborates ; abrastol, formaldehyde and benzoic acid. Potassium nitrate and hydrogen per-oxide are also used.

Salt is universally employed as a preservative for butter. It is absolutely harmless too. Besides salt, various other substances are used as preservatives ; the most usual are mixtures of borax and boric acid, though formalin, salicylates, sulphites, fluorides, and potassium nitrate have also been employed.

Cements.

485 P. A. S., Kumta. Asks how cement is commercially prepared.

Cements consist of certain earths so compounded that when mixed with water, chemical action takes place, and there is absorption both of water and of carbonic acid gas, the water forming crystals with the earthy matter and the carbonic acid forming carbonates.

Portland cement is made by adding to limestone such a proportion of silica and alumina as will form the best cement. Natural limestone such as chalk is a carbonate of lime, and is converted into calcium oxide or caustic lime, when highly heated, the carbon dioxide being driven off as gas. Mixed with water, caustic lime hydrates to a soft paste with great evolution of heat. Calcination of a clay limestone may be carried out so as to produce either a hydraulic lime. a quick-setting cement, or a cement like Portland. Much depends on the temperature of the kilns for the subsequent chemical or setting process is different.

Cement is burned in both plain and rotary kilns, and with coke, coal, or oil fuel, all of which have their effect on the percentage composition of the finished cement. After cement has been burned the rough clinker may be dampened to rid it of the effect of any underburned portions by hydration, prior to grinding. It is finally ground to extreme fineness.

Golden Colour on Brass.

575 V. K. P.. Trivandrum. Writes, "Please let me know a simple process of giving brass a golden colour."

To give brass a golden colour it is dipped until the desired shade is obtained into a solution of about 175 F., produced as follows: Boil 4 parts of caustic soda, 4 parts of milk sugar, and 100 parts of water for 15 minutes; next add 4 parts of blue vitriol, dissolved in as little water as possible.

Rolled Gold.

The same gentleman asks what is rolled gold.

What is called "rolled gold" consists of a sandwich of base metal and real gold. Gold being a very soft metal, is capable of being rolled or hammered out to an infinitesimal thinness, and the real principle of a rolled gold article is that a base of other metal is placed between sheets of gold, and the whole "mangled" as it were. The result is that the gold spreads over the other metal which comes out covered on either sides with a coating of the gold.

"Rolled gold" is real gold and not imitation but is not solid gold. How far down the gold stretches before the base metal is reached varies with the amount that was put into the "mangle." In some cases the gold will wear for a lifetime and still look like the gold; in others, so little has been allowed that it will wear off in a short time, showing the base metal below

Resilvering Mirror.

141 A. D., Madras. Wants a good recipe for resilvering mirror.

Dissolve silver nitrate, 1, in distilled water, 8 and divide the liquid into two equal parts. To one add sufficient solution of ammonia to redissolve the precipitate first formed, and to the clear solution add pure caustic potash, 1, dissolved in distilled water, 16. Redissolve any precipitate which remains on standing by the cautious addition of ammonia stirring well. Then add the rest of the silver solution and make up to 200 fluid parts with more water. Now make a solution of sugar of milk, 1, in water, 20; add a few drops of 90 per cent. alcohol, and mix the solution. Before using, the glass to be silvered should be thoroughly cleaned, and freed from greasiness especially. The glass is immersed in the liquid in a warm place until well coated. It is then taken out and washed, and one side cleaned of the coating. The silver solution will keep, but the reducing solution should be freshly prepared. When the coating is thoroughly dry it should be backed with a coating of Japan black carefully applied.

To Prevent Rust.

468 S. B. P., Nagpur. Writes, how to prevent iron from rusting.

Protection against rust in rolled iron and steel plates is best afforded by cleaning them first from scale, by a process of pickling before the application of paint. On such mechanically cleaned plates one or two applications of pure red lead in pure raw linseed before the final coats of paint will afford protection for an indefinite period. A coat of hot boiled oil is a good substitute with which to coat all castings and forgings and plated work intended for erection out of doors, before doing any work upon them.

But while cast iron requires no preliminary scaling, wrought iron and steel should have such treatment, because rust once started will increase beneath scale and paint. Cast iron is better able to withstand corrosion than wrought iron or steel, and white iron than grey.

Arrack from Toddy.

Though the vernacular for any alcoholic liquor is "arrack," arrack proper is a liquor distilled either from toddy, the fermented juice of the coconut palm, or from malted rice. The arrack of Goa and Colombo is generally considered the best, and is made from toddy alone. This latter is obtained by the incision of the palm, and is collected in pots hung to the tree under the cuts. It is then fermented and distilled. In preparing rice arrack, as carried out in

Batavia and Jamaica the rice is covered with water and allowed to germinate, dried at a temperature of 59° F., which arrests germination and then a wort is made from malted rice in the same manner as from malted grain, which is afterwards distilled. The commonest pariah arrack of this country is generally narcotic, very intoxicating, and unwholesome. It is prepared from coarse jaggery sugar, spoilt toddy, refuse rice, etc., and rendered more intoxicating by the addition of hemp leaves, poppy heads, juice of stamonium, and similar deleterious substances.

Uses of Sumbul Root.

45 R. R., Hyderabad. Wants to learn the uses of sumbul.

Sumbul root yields about 0.5 per cent of an essential oil, having a musky smell. The plant, Ferula sumbul, N. O. Umbelliferae, is grown in India, and also Russia and Turkestan, where it is known as *Jata mansi* and musk root. The oil is difficult to obtain. but a strong tincture, 1 in 5, in 90 per cent. alcohol will replace it, and the resin (about 6 per cent) extracted will at the same time make an excellent fixative for oriental boquets.

Clarifying Honey.

721 M. H., Battan Hawe. Wants to clarify honey.

After the honey is passed from the comb, strain it through a sieve, so as to get out all the wax ; gently boil it, and skim off the whitish foam which rises to the surface, and then the honey will become perfectly clear. The vessel for boiling should be earthen, brass, or tin. The honey should be put in jars when cool, and tightly covered.

White Chalk for Canvas Shoes.

514 R. R. G., Khitauli. Desires to prepare white chalk for canvas shoes.

The chalk used should be in as precipitated a condition as possible, success in preparation depending greatly on the fine state of the chalk used. The method of preparation is as follows. Digest 1 oz. of bleached shellac and 3 oz. of borax in 16 oz. of hot water until the first two are dissolved in it. Then to this should be added pipeclay or prepared chalk, in fine powder when a creamy liquid will be formed. The proper amount of chalk or clay to be used can easily be ascertained by a trial or two, using less water and a little soap. Finally the pasty mass should be moulded and baked or dried in the sun. This will result in quick whites like Blanco.

Scorpion Sting.

348 V. S. S., Jaipur. Writes, "Please publish in your esteemed journal a good recipe for scorpion stings."

Mix two parts, by weight, of chloral hydrate with one part of camphor. Mixed together, they form a liquid. Prick the injured spot with a needle and rub in the compound—which is for external use only, being poisonous. One part of this mixture in six hundred parts of water also relieves mosquito stings.

Mercerising Cotton.

347 K. M. K., Dhangaon. Writes, please describe the process of mercerising.

Mercer in 1844, made out a method by which cotton yarn became lustrous after a five-minute action of concentrated caustic soda and a wash afterwards. But care should be taken not to keep the yarn in caustic soda : the yarn may be weakened by its action. Cotton must always be kept stretched, so that uniformity might be kept. The wash waters may b evaporated and caustic soda recovered. Caustic lye in no case should be above 65°Tw. and caustic soda used must not be less than 55°Tw. To test a cloth piece or cotton for mercerisation is to immerse the pattern in a solution of iodine saturated in potassium iodide solution for a minute. After taking it out, it must be washed with cold water.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of INDUSTRY are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

64 K. C. W, Jamnagar. An article on the subject you mention will be published shortly.

69 D S. B, Moradabad. An article on the eradication of pests such as bugs, mosquitoes is in the course of preparation.

271 M. D, Benares. A golden lustre may be obtained on nickel plated articles by rubbing the metal with the ashes of linen rags which have been impregnated with a solution of gold.

286 J. N. S, Malda. The required recipe will soon appear.

308 M. G. V. F, Bangalore. Vide No. 64.

319 N. K. D. Rangoon. Vide 286.

328 T. S. M. C, Tanjore. Vide No. 64.

331 M. V. S, Bhatkal. The process is not at all feasible.

401 M. R. B. G., Hyderabad. Stamps on glass is effected by what is known as hot sand blasting.

404 K. .S., Kandy. Apparatus for distilling water on a large scale may be furnished by Bengal Scientific Supplies Co., College Street Market, Calcutta.

459 N. L. K., Agra. Vide No. 64.

576 M. J. S, Ankola. Answer to your query has appeared already.

645 B. M, Halol. Appeared in January 1924.

738 P. K. C., Berhampore. Formula of artificial asafetida appeared in July, 1923 issue. Process of preparing damp-proof glue appears elsewhere in the current issue.

739 C. N. C. & Co, Salem. Formula of re-inking typewriter ribbons appeared in August, 1921 issue of INDUSTRY. Rebuilt typewritor may be had of American Writing Machine Co., Inc., Newark, New Jersey and Whole-Typewriter Co., Inc., New York; both of U. S. A. For typewriters enquire of Remington Typewriter Co., New York; and Underwood Typewriter Co., New York; both of U. S. A.

741' D. U. M, Surat. Government Officers are not allowed to conduct any private business. Wants to dispose of 11th, 12th, 13th and 14th volumes of INDUSTRY.

742 P. S. B., Haldwani. There are many castor oil mills in Calcutta. Castor oil is yielded in very large quantity by hydraulic press.

744 M. N. K., Udipi. For sugar manufacture you may correspond with Mr. M. Asanulla, 3, College Square, East, Calcutta. Jaggery can be converted into sugar; for the detailed process consult the May 1924 issue of INDUSTRY.

745 B. M. A., Sukkur. For swadeshi goods enquire of Swadeshi Co-operative Stores Ltd., 15, College Square, Calcutta.

746 R. R. N. & Co., Bombay. It is too late for sending any exhibits to the British Empire Exhibition now.

Cheapest House for

Sporting Goods

Silver Medals, Cups & Shields.

Fine Silver Medals in Velvet lined cases.

Rs. 3-12 Each.

Largest Stock & Variety.

Illustrated Lists Free.

CARR & MAHALANOBIS

CHOWRINGHEE CORNER CALCUTTA.

747 C. I. , Lahore Cantt. For estimate of starting a sugar factory on small scale write to Messrs Macbeth Bros., 2 and 4. Hare Street, Calcutta.

748 K. L. M. L., Karaul. Please use pure chemicals and mix the chemicals scientifically.

751 S. V. Calcutta. Chaulmugra oil is prepared from chaulmogra seed while neem oil is prepared from neem pods. Neem oil may be had of Messrs B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta.

752 K. C. A., Rawalpindi. For magical apparatus you may try the Magic Hall, Jhansi and Magic House, Nagpur City

753 H. R. G., Beilary. Formula of washing soap similar to Sunlight soap appeared in August 1921 issue.

756 M. M. G, Calcutta. Please refer your query to the Director of Public Health of the various provinces.

759 B R K., Aligarh. For soda water machine, etc try Vitaldas, Karsondas, 361. Upper Duncan Road, Two Tanks, Bombay No. 8 and Little & Co, 3, Grant's Lane, Calcutta.

760 S. A. J., Rangoon. Formula of washing soap appeared in October, 1923, issue. Formula of hair' dye powder appears elsewhere.

764 N. C. P., Mehmedabad. Export and Import Review may be had of Thacker Spink & Co., 3, Esplanade, Calcutta.

765 S. D. S., Rambagh. Vernacular language in India being varied it is not possible to publish the formulas in all the vernaculars of India. If however you mention your own vernacular we shall try our best to meet your requirements.

766 N. N. D., Puri. For Black enamel you may try any paint-shop of your locality. You may also enquire of G. C. Laha, 1, Dharamtala Street and Nagendra Nath Daw & Co., 13, Dharamtala Street; both of Calcutta.

767. S. M. A. Madura. Cardboards are generally made of all kinds of waste paper and other refuse materials of a paper mill. Detailed process appeared in February, 1924 issue of INDUSTRY.

769 S. M, Saidpur. For starting prospective small industries please go through September, 1922 issue of INDUSTRY.

771 K. H. D, Bhongir. 'Cigarette papers may be supplied by Alexander and Alexander, 88-90, Chancery Lane, London W. C. 2 and L. Kehlmann & Co., 220, West 28th Street, New York, U. S. A. For cigarette boxes enquire of Calcutta Fine Art Cottage, 74, Dharamtala Street, Calcutta.

772 M. I K., Shahdol. The following are the paper mills of India: Bengal Paper Mill Co. Ltd., 103, Clive Street, Calcutta; Titagarh Paper Mills Co. Ltd., Chartered Bank Bldg., Calcutta; Girgaum Paper Mills, 77-79, Apollo Street, Bombay. Upper India Couper Paper Mills Co. Ltd., Lucknow; Meenakshi Paper Mills Co, Punalur, Travancore; Scindia Paper Mills Co. Ltd., 103, Clive Street, Calcutta and Deccan Paper Mills Co Ltd., 561, Bhawani Pet, Poona.

776 C. S. L., Colombo For Cashmere artwares enquire of Messrs Lasso & Sons, 3rd Bridge, Srinagar; Haji Asgar Mir & Bros, 1st Bridge, Srinagar and Khazir Mahamed & Sons, 3rd Bridge, Srinagar; all of Kashmir.

775 M. A. M., Colombo. Formula of washing soap appeared in October, 1923 issue.

776 P. C. Y. R., Myitkyina. Horns can not be melted but can only be softened, the process of which appeared in September 1921.

The Ideal Cooker
FOR THE HOME
New manufactures cheaper prices & larger output are our aims.
Illustrated Catalogue free—
Annapurna Cooker Co.
No 1 A.P O. Thalakwadi,
Belgaum, M S M. Ry.

778 M. A. V., Junagad. Calcutta Motor & Cycle Co., 54A Bentinck Street and Bentinck Cycle Co., 40. Bentinck Street, both of Caclutta, stock cycles and motors. Wants to be put in touch with dealers in Agar Atar in Sylhet and Calcutta.

779 N. P. S., Agra. For industrial books enquire of Messrs Chakraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

780 K. T. C, Bombay. Tin box making machines may be supplied by Alfred W. Stoker, Ingram House, 165, Fen Church Street, London E. C.

782 M. & Co., Surat. Want to be put in tough with dealers in snuff-boxes made of wood and horn and carved with mother-of-pearl.

785 K. T. J., Kohri. No other address is known. Tailoring may be learnt of D N. Bakshi & Son, Abbottabad; Bengal Tailoring Institute, 14, Raja Nobo Kissen Street, Calcutta.

786 D. P. G., Anjar. The chemicals you require may be had of B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta; Chemical Co. Ltd., 35-1, Panditai Road, Ballygunge and Bengal Chemical & Pharmaceutical Works Ltd. 15, College Square: all of Calcutta.

787 D D. S., Jhang. Your query being in the nature of an advertisement should not be put in these columns.

788 M. K. R., Cuttack. The general process of bleaching and clarifying oils may be applied in case of polang oil also. Process of bleaching oils appeared in May 1922 issue. Defect in colour of rubber stamp is perhaps due to inferior quality of rubber used by you.

789 M. K. R., Hyderabad. Process of silvering mirror appeared in March 1923 issue. Glass sheets may be had of Behary Lal Dey, 15 & 16, Swallow Lane and Fotic Lal Seal & Sons, 16, Swallow Lane; both of Calcutta.

791 N. V. N., Pollachi. Sewing thread may be had of Natoomal Chellaram, 828, Merriott Road, Karachi.

793 S B, Kheri. For starting business with small capital please go through New Idea columns of INDUSTRY.

795 L. R. L., Shillong. Your query is quite unintelligible.

796 I. D. S., Dehra Dun. Wood cutting machines may be had of Messrs Alfred & Herbert Ltd., 13, British Indian Street, Calcutta.

797 A. G. C. & Co., Madras. Lemon grass oil may be had of Sindu Annaswami, Nurani, Palghat, Dt. Malabar and Theni Gywe Bros., 7, Jeweller's Street, Prome, L. Burma.

799 G. C., Lahore. The answer to your query will appear in an early issue.

801 F. H. K, Biliochpura. Desires to be put in touch with dealers in old dhooties and saries of Calcutta, Horraha and Dacca.

803 K. V., Conjeeveram. For canning mangoes you are referred to the series of articles appearing on Canning—How it is done. Green mangoes may be prepared into preserves or *achars*, recipes of which appear elsewhere.

804 N. B M. Co., Dacca. The following are a few of the trade papers which may suit you: Daily Gazette, Caxton House, Kutcherry Rd, Karachi; Rangoon Times, 7, Merchant Street, Rangoon; Industrial South Africa, Market Street, Pretoria State, Africa; Ceylon Observer, Colombo.

805 K. S. Besnet., Rajputana. Your queries are still under consideration.

806 R. M. D., Manipur. Sulphuric acid and caustic soda may be had of the Calcutta Chemical Co., Panditia Road, Ballygunge, Calcutta. Mahuwa oil is supplied by Prabhudas Kashi Prasad, Dhamtari and Changna Marwari, Mohal, Manbhum.

809 S. D N., Delhi. For moulds enquire of Messrs L. B. Verma, Cawnpur.

809 K. L., Rewari. Methods of cleaning aluminium vessels and soldering them appeared in the issues of September, 1923 and December, 1923.

810 B. C. G., Dhuliyan. An article on poultry keeping appeared in the January (1924) issue of INDUSTRY. Your suggestions are further receiving our best attention.

811 S. A. U., Coondapur. Laundry machines may be purchased of Messrs Symington Cox & Co., Mercantile Buildings, Calcutta. Apparatus of small sizes and of low prices will serve no useful purpose.

812 T. Z., Aijal. For liquid depilatory enquiry may be made of Messrs B. K. Paul & Co., 1-3 Bonfield's Lane, Calcutta

813 B. C. A., Baradani. Process of making rope will be found detailed in the July, 1921 issue of INDUSTRY. Machineries for rope making are manufactured by Watson Machine Co., Paterson N. I., U. S. A. You may also have the machineries imported through Messrs Oriental Machinery Supply Agency, 20-1, Lal Bazar Street, Calcutta.

814 A. A. O., Rawalpindi. Your query is outside the scope of INDUSTRY.

815 L. B., Ranchi. You may send for illustrated catalogues of linen and and wearing outfits from a few big companies. There you will get a large number of patterns as wanted by you.

816 B. D. N., Darbhanga. Phials are suppplied by Messrs Satya Charan Paul, 194, Old China Bazar Street, Calcutta. Messrs H. L. Sett & Sons, 8 Nilmony Mitter Street, Calcutta can supply cardboard boxes of all descriptions.

817 K. M. S., Ferozabad. Please state to what dialects the words you mention belong

819 M. A. K., Vizianagram. Evidently you require tin containers for packing tobacco. Try the Bengal Box Manufacturing Co., 79-1, Raja Nobokissen Street, Calcutta. The address of Indian industries are given from time to time in these pages.

820 J. H. A., Hyderabad For the machineries you require please enquire of the Oriental Machinery Supplying Agency, 20-1, Lal Bazar Street, Calcutta.

822 H. R. V., Meiktila. To learn the art of dyeing write to the Principal, Government Weaving Institute, Serampore, E. I. Ry.

824 K. S. G., Jaipur. Wants to be introduced to dealers in artificial white pearls.

825 Y. N. B., Daulatpur. For ochres, etc. please write to Calcutta Mineral Supply Co., 31, Jackson Lane, Calcutta.

826 P. B. & Co, Sukkur, Sind. The further activities of the Swedish Match Factory are not known. A factory, it is understood, is under erection in Amarnath near Bombay. The shares of the company have also been floated in India. Answer to other querries appear elsewhere.

827 R. B. P., Kollengade. Tin boxes are printed according to order by Messrs P. Lodge & Co., 3, Balak Dutt Lane, Calcutta and also by Calcutta Hollow Wares and Colour Printing Ltd., 133, Belliaghata Main Road, Belliaghata, Calcutta.

828 V. D. S., Bombay. Formula of preparing hair oils appeared in the issue of April, 1923 of INDUSTRY. Lime-juice glycerine also will be found in the August, 1921 issue of INDUSTRY.

829 M. L. N. R., Masulipatam. For electrical installations and power houses you are referred to the Messrs Bando & Co., 3, Hare Street, Calcutta.

831 N. R., Hoshiarpur. The formula regarding artificial gold was sent out to us by one of our readers, whose address appears there and with whom you can communicate on the matter. Process of dyeing ivory appeared in March, 1920 issue. The address of the person referred to is Mr. Mehr Chand, B.A., L.L.B., Wazirabad, Punjab.

832 B. D. D., Gurdaspur. For books on syrups write to Messrs Chakraberty Chatterjee & Co. Ltd., 15,

College Square, Calcutta. Pickles and achars and their preparations have been treated elsewhere in this issue.

833 K. N., Agra. The polish you mention being a trade name, its recipe is not known to us. The method of preparing shoemaker's polish appeared in June 1922 issue of INDUSTRY.

834 D. N. H., Daltonganj. .Has a large stock of charcoal for sale.

836 M. A. K., Nimar. You may go through a book of taxidermy, to be had of Messrs Chakraverty Chatterjee & Co. 15, College Square, Calcutta.

837 B. C., Thana Bazar. The oils may be coloured suitably with aniline dyes to be bought of Messrs Hansraj Vishram, 13, David Joseph Lane, Calcutta. Amla Oil being a trade name its exact preparation is not known.

842 M. A. M. & Bros., Hyderabad. Electrical fans are imported by Messrs. Pioneer Electrical Co, 22, Church Gate Street, Bombay; woollen articles by H. A. Mahomed, 191, Nagdevi Street Bombay; fancy goods by Bombay Stationery Mart, Victoria Bldg. Parsee Bazar, Bombay.

844 J. D. Sukat., While thanking you for the suggestion it is rather hard for a technological journal like INDUSTRY to trace company activities individually.

845 C. P. I. S., Khitauli. Process of glazing earthenware appeared in the September, 1921 issue of INDUSTRY. Formula of face powder and tooth power will be found in the February, 1922 and June, 1922 issues.

846 C. R. D. Bros., Surat. The jari merchants of Calcutta are Charandas Harnamnas, 37 Cross Street and Harkishen Das, Gupta & Co., Sree Dew Jeu Temple, Banstola.

848 J. D. J., Saharanpur. Calcutta University has got arrangements for teaching industrial chemistry in the post-graduate classes

851 H. B. K, Poona city. An article on construction of dry cell appeared in March 1924 issue and the method of refilling dry cell appeared in June 1923. For books on paper modelling write to Messrs Chakravertty Chatterjee & Co Ltd., 15 College Square, Calcutta.

853' R. K. D., Mymensing. Formula of laundry soap appeared in Oct. 1923 issue. Gum is a thick, transparent fluid, that issues spontaneously from certain species of plants, particularly such as produce stone fruit, as plum and cherry trees. It is very adhesive, and gradually hardens by exposure to the atmosphere. It is usually obtained in small pieces, like tears moderately hard and somewhat brittle while cold; so that it can be reduced by pounding to a fine powder. Formula of preparing catechu appeared in June 1922 issue.

854 R. N. D., Sutna. For pocket electric lamps and other novelties please enquire of T. G. Shah's Electric Stores, Bombay No. 4. Process of refining castor oil appeared in January 1924 issue of INDUSTRY. For the required chemicals try B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta.

856 R. K. D, Bombay. Now there is still ample scope for taxidermist to prosper in India; hence if you learn that industry you may prepare zoological specimens for museum.

857 D. T. K., Bhirea. For perfumery enquire of B D. Gore, Sayana Bldg, Loharchal, Bombay 2; the Home of Scents, 949 Chota Bazar, Mhow. C.I. and P. Mukherjee & Co., 29-30, College Street, Market, Calcutta.

858 K. & Bros., Mehrchandwala. There are many match factories in India

Bombay Deshi Oushadhalaya.
Factory and Dispensary.
ASK FOR ANY FEVER
AGUE KILLER.
1 Phial As. 8. Doz. Rs. 5.
and our other popular remedies. Can be had everywhere at Cheapest Rate.
PEARL & CO.,
Victoria Garden, Bombay.

more important of which are ; (1) Amrit Match Factory, Bilaspur, Kotah ; Bandemataram Match Factory, Tallygunge, Calcutta and Sunderban Match Factory Ltd, 12, Dalhousie Square, Calcutta

859 M. R., Madras. You may write to the Secretary to Association for the Advancement of Scientific and Industrial Education of Indian Students, 10, Old Post Office Street, Calcutta.

861 N. C. B., Rajbari. Silver cloud cigarettes may be had of Arcadian Tobacco Co. Ltd, 80, Calootola Street, Calcutta and Bear's cigarettes may be had of Abdul Samad & Co., 47, Canning Street, Calcutta.

864 S. R. Bros., Eranhipalam. For gunny bags enquire of Adamjee Hajee Dawood & Co. Ltd, 55, Canning Street, Calcutta and Meenatchi Trading Co., 290-300, Linga Chetty Street, Madras.

865 C. G, Aijal. Foreign wools are imported by E. B. Bros & Co., 11, Dharamtala Street, Calcutta. Matches are imported by B. M. Start & Co., 133, Canning Street and H. Rashid & Co, 15, Zakariah Street ; both of Calcutta. Aluminium and enamel wares may be had of Messrs. T. E. Thomson, Esplanade, Calcutta. For ginger both dried and undried enquire of Messrs. Jogin Chandra Dass & Co. 54. Canning Street, Calcutta.

867 C. P, Pyinmana. Formula of lubricating oil appeared in June 1923 issue of INDUSTRY. Gum arabic, nut galls, etc. may be had of Bansidhar Dutt, 126, Khengraputty, Barabazar, Calcutta. Refer No. 917.

860 M. M. T., Bombay. Formula of lime-juice glycerine appeared in August 1921 issue of INDUSTRY.

871 J. S, Narsapur. For learning soap-making apply to Rijen Soap Works, 8 Kinnu Sircar Lane, Khurut, Howrah.

872 C. A. A. S. R, Cumbum. Your query is outside the scope of INDUSTRY.

873 N. K, Patiala. Formula of hair dye appears elsewhere in this issue. Formula of hazeline snow will appear in an early issue.

874 T. R. S, Kalyandrug. For estimate for setting up a match factory please write to Ghatak & Co., Rai Bahadur Road, Behala ; Bhawani Engineering and Trading Co., 122-1 Upper Circular Road and Bengal Small Industries Co., 91 Durga Charan Mitter Street; all of Calcutta. For thread balling machine enquire of Oriental Machinery Supply Agency Ltd., 20-1 Lal Bazar Street, Calcutta.

876 G. A. A, Aundh. An article on glass bangle manufacture appeared in June 1923 issue. For polishing lathe enquire of Messrs S. K. Dass & Co., 215 Old China Bazar Street, Calcutta. For oil lamps, blow pipes, etc required for glass industry write to Messrs M. Seth & Co., 71-1 Sukea Street, Calcutta.

877 J. K. D, Chittagong. Wants to be put in touch with manufacturers of or dealers in tape similar to Remington type writer ribbon tape. Coconut oil may be had of Panch Kari Tat & Sons, 6 Meer Bhahar Ghat Street, Calcutta.

881 B. D. P, Batala. A book on the manufacture of syrup will shortly be published from INDUSTRY Office.

884 B. N. S, Narsipur. Formula of dyeing silk appeared in January 1922 issue. H. Rashid & Co, 15 Zakariah Street, Calcutta deal in imported Japanese silk. For Indian silk enquire of Basant Lall Khettry, 115 Harrison Road and Harchand Roy Hookamchand Fadi. 62 Cotton Street; both of Calcutta.

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Oil.

Used by all nations for preserving and beautifying the hair & keeping the head cool & brain refreshed. Rs. 1-4 per bottle.

(Registered).

TRY IT ONCE.

Sold Everywhere.

885 N. R. P. & Co, Secunderabad. In making blue black ink from gallnut etc. indigo should be added and not aniline colour.

886 R. P. M, Mandawar. Refer to No. 917.

887 C. S. H. H, Khanpore. Rice threshing machine may be had of Messrs Macbeth Bros, 2 & 4 Hare Street, Calcutta.

888 G. R B, Mandla. Please go through the New Idea columns of INDUSTRY.

889 P. C. S., Lahore. Biri making is a very simple process. You can learn the whole art by watching for half an hour a Biri maker doing his job.

890 R. K. C, Bellary. Wants to be put in touch with dealers in engraver's tools.

894 R. S. I, Eranhikulam. White wax may be had of Banshi Dhar Dutt, 126 Khungraputty, Barabazar, Calcutta. Wants to buy Valsaomfir. Refers No. 929.

895 J. S, Jhelum. Please repeat your queries more explicitly.

897 R. K. C, Bellary. For marble stone please try C. Arais, 40 Radhabazar Street, Calcutta; Llewelyn & Co, o and 9-1 Waterloo Street, Calcutta and F. Muraglie & Co, 20A Fort Street, Frere Road, Bombay.

898 S. K. R, Andanapet. Please refer your query to the conservator of Forest, Debra-Dun.

899 H. C. B, Rawalpindi. If you boil beeswax with pearlash, the stickiness of beeswax will be removed.

901 N. R, Calcutta. The old paints etc are to be scraped off. No solution is known to remove these. You may however make enquiries in the paint shops in Clive Street.

903 T. Z, Aijal. For twill shirts write Gostobehari Bhar, Upper Chitpur Road, Natoon Bazar Calcutta. For drugs, etc apply to Messrs B K. Paul & Co., 1-3 Bonfield's Lane, Calcutta. The last part of your query falls outside the scope of INDUSTRY.

904 D. P. S, Bareilly. The name of the match factory you refer to is Amrit Match Factory, Bilaspur, Kotah. Wants to know the name and address of manufacturers of umbrella cigarettes.

905 F. & Co, Quilon. Want catholic transfer pictures.

906 K. T. R, Tuno. For manufacturing flash lights you are referred to the article on the construction of dry cells which appeared in the March 1924 issue. Methods of silvering mirror were published in the last April issue which you may please consult.

907 N. M. S, Cherrapunji. Any engineering workshop can execute the order you mention. You may try Calcutta Industries Ltd, 71, Canning Street, Calcutta. Dentistry is taught at School of Dentistry, 26A South Parade, Bangalore; Maniram Dental College, Amritsar and Calcutta: Dental College, and Hospital, 12/1 Esplanade East, Calcutta.

908 I. S, Depalpur. You may send the sample of soil for analysis to the Chilean Nitrate Delegation, 6 Mission Row, Calcutta.

909 V. R. P. C, Secunderabad. The chemicals mentioned by you may be had of the Oriental Industrial Company, 19 Bonfields Lane, Calcutta.

912 D. P. J. P., Moror. That Indians are being recruited for services in Japan is unfounded. Regarding labour in British Guiana please enquire of the Indian Labour Emigration Bureau, Delhi. In the preparation of boot polishes the use of turpentine will materially improve the quality of your production.

913 I, G. T. Co., Cownada. Want to be put in touch with direct importers of German novelties. Try Singh Sirkar & Co, 126, Harrison Road, Calcutta.

Is Your Income Sufficient ?

Are you anxious to increase your Income and earn a decent fortune working in your leisure ? Then read "How to Get an Income ? which will put you to earn the moment you read it. Patronised by Judicial Officers, Zamindars, Educationists, Clerks and Labourers. Price per copy including V. P. P. charges is As. 11.

"SOUTHERN MAIL"
Srirangam Post Trichinopoly, S. I.

914 A. C. Co., Thalakvadi. Oil mills are rarely worked by hand. They are either driven by animal power or electrical power. The ordinary mills can be made by the carpenters. For big mills to be worked by electrical energy enquire of Messrs S. L. Dutt & Co. 42-1-2 Murari Pukur Road, Calcutta, Messrs Ghatak & Co., Rai Bahadur Road, Behala, Calcutta may also be written to for the mills.

915 V. A., Jorhat. Has got a large stock of feather for disposal.

916 K. J. J., Cochin. Magical apparatus is stocked by Magic House, Nagpur City and R. C. Verma, Mohendru, Patna. For books write to Messrs Chakraverty Chatterjee & Co., 15, College Square, Calcutta.

917 R. M. Mandawar. The pamphlet on the Improvements in Native Methods of Sugar Manufacture (Bulletin No. 19) by S. M. Hadi is available of the Superintendent, Gavernment Printing, Allahabad.

918 N. C. R., Kurnool. For electric installation, you are to have a power house for generating electrical energy. For estimates etc. you are referred to Messrs Bando & Co, Lal Bazar Street, Calcutta.

919 P. R. A., Bahawalpore. For veneers for match boxes and sticks write to Bhowani Trading and Engineering Co., 122-1, Upper Circular Road, and Sunderban Match Works, 12, Dalhousie Square; both of Calcutta. Mr. A. P. Ghose, M.S.C.I., 42, Beniapukur Road, Entally, Calcutta may be consulted for preparation of matches.

920 L. A., Harda. For learning the art of cutting lenses please communicate with B. N. Baijlal, Moradpur, Patna. To remove oil spots from paper apply a solution of pearlash in the proportion of 1 oz. of pearlash to 1 pint of water to the oil-stained spot.

921 R. G. N., Trichinopoly. Sugar is to be refined for converting it into white. Particulars on the subject may be made of the Indian Sugar Bureau, Pusa.

923. M. S. S., Ferozabad. For the chemicals you require apply to Messrs B. K., Paul & Co., Bonfield's Lane, Calcutta.

924 R, M. S., Firozabad. For *churi* presses write to the Calcutta Industries Ltd., 71, Canning Street, Calcutta.

926 S. N. L., Basti. Til oil may be extracted by working the ordinary oil mills known as *ghanis*. Scents and perfumes may be purchased of P. Mukherjee & Co., 28-29, College Street Market, Calcutta. Til oil and floral oils are held in stock by Khoda Buksh & Co., 7, Colootola Street, Calcutta. For coconut oil see 877. Blocks are made and printed by U. Roy & Sons, Garpar Road, Calcutta. For stationery articles try Nilmoney Haldar, 106, Radha Barar Street, Calcutta. Cardboard boxes are manufactured by Mssrs. M. C. Shah, 38 Colootola Street, Calcutta. Trade marks may be registered through P. Lodge & Co. Post Box 6772, Calcutta.

927 M. S., Amritsar. Method of preparing rubber solution appeared in the issue of March 1922. Only crude rubber should be used. Method of deodorising oils is a little cumbrous. A process will however be found detailed in the April, 1922 issue.

928 S. B. & Son, Vizagapatam. Chemical requisites for match industry are supplied by Calcutta Chemical Co., 35/1 Panditia Road, Ballygunge, Calcutta. Match sticks and veneers, etc. may be procured from Bengal Small Industries, Co., 21, Durga Charan Mitter Streets, Calcutta and Sundarban Match Works, 12, Dalhousie Square, Calcutta.

929 A. M. & Co., Hampankatta. Boots are manufactured by Messrs Shandell Bros. & Co. Ltd., Meston Road, Cawnpur and Bengal Tannery Co., 31-14, Lower Chitpur Road, Calcutta. The Oriental Machinery Supply Co. Ltd., 20-1, Lal Bazar Street Calcutta can supply machines for making wire hooks. Plaster of paris may be purchased of Calcutta Mineral Supply Co., 31, Jackson Lane, Calcutta.

930 C. S. A., Madura. For cultivation of cardamom a fairly deep rich loamy soil, resting on rock, seems indispensable. Shade and a humid atmosphere are essential—it luxuriates in mists, fogs and cooling sea breezes. It is grown in betel-palm and pepper gardens of the Sirsi and Sidapur Taluks of Kanara. The sowing season is September-October ; the plants are transplanted when four feet high and fifteen to eighteen months old. The capsules are in season in September-October and are severed from the scape and not plucked. These are then dried in the sun for three or four days and cleansed by hand rubbing. The exports of cardamom take place to the United Kingdom, Arabia, Germany, Turkey, Persia, and Egypt. Further details will be published in a subsequent issue of Commercial India.

932 K. N. B. & Co , Rewari. For sheet metal enquire of Dore Brooker & Co., 5, Fenchurch Street, London E. C. 3 and Heidersdorf and Pape, Hamburg 23, Germany. Dyes may be supplied by Dyestuff Corporation Ltd., 17, Kingsway, London W. C. 2 and Soffarbenfabrik Engstfeld, Dusseldorf 65, Germany.

934 A. S. D., Karachi. For the required book enquire of Ananda Asram, Poona.

936 J. Bros., Delhi. For technical books write to Messrs Chakravertty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

937 P. R., Tumkur City. Thread balling machine may be had of Oriental Machinery Supply Agency Ltd., 20-1, Lall Bazar Street, Calcutta.

938 S. B. G., Bhiwandi. A list of books on rice industry has been appended at the end of the article on rice industry in April issue of Industry.

939 B. P. V. Bros., Partabgarh. For spectacles, lenses, etc. enquire of Messrs Lawrence and Mayo, 16, Old Court House Street, Calcutta.

940 S. M. C., Lakheri. If you inform us of your difficulty we shall try our best to solve it.

943 Y. D. D., Jalna. Formula of water colours and distemper will appear in an early issue of Industry. White chalk is a natural product and is found in mines. Handpower tin printing machine is not available. For grinding machine enquire of Oriental Machinery Supply Agency Ltd., 20-1, Lal Bazar Street, Calcutta. Process of preparing pepermint crystal appeared in December, 1921 issue.

945 S. C. D. P., Saktipur. Til oil may be used as a base oil for hair oils without being treated chemically.

946 P. L. J., Calcutta. For tin cans for boot polish enquire of Higashidani & Co., 17, Itchome, Kitahorie, Kamidorie, Nishi-ku, Osaka and Kiyosu Shoten, Tsukishima Kyobashi-ku, Tokyo ; both of Japan. Wants to be put in touch with dealers in boot polish manufacturers.

947 I. H. S., Bhatkal. Process of deodorising oils appeared in April 1922 issue. Your other queries will appear in an early issue.

948 A H. K., Aurangabad. Footballs, bladders, etc. may be supplied by Julius Dietrich and Hannak, Chemnitz, 91 and W. Brenger and Sohn, Barmen ; both of Germany.

950 S. R. & Bros., Enugurti. For block making tools enquire of Messrs N. G. Mitra & Co., 135, Chandney Chuck, Calcutta. Process of making blocks appeared in February, 1923 issue.

951 K. R., Umarpoti. Formulas you require will appear in an early issue of Industry.

Weigh Yourself

After using **Amrita Kundu Salsa with Gold** for only 2 weeks, you will find that your weight has much increased. It **Purifies the blood**, and increases and strengthens the growth of blood by creating blood corpuscle. It destroys the **mercusial and syphilitic poison.** Price 1 phial Re. 1. **Postage 8 as** 3 phial Rs. 2-8, Postage 15 as.

Catalogue free on application.

KAVIRAJ DASHAROTHY KAVIRATNA.

Dawn Lane, Hatkhola Post, Calcutta.

952 R. C. M., Bombay. Scrape the tiles.

953 T. S. V. P., Tinnevelly. For the machine required in rice industry write to Messrs Marshall Sons & Co. Ltd., 99, Clive Street, Calcutta.

954 M. S., Chittagong. For the present address of Kajer-Lok write to Mr. Santosh K. Sett, Chandernagar, E. I. Ry. In preparing fruit syrup ingredients should be first refined as refining of syrup is not so advantageous. An article on *murabba* of various kinds will appear in an early issue. For the required book enquire of Messrs Thacker Spink & Co., 3, Esplanade East, Calcutta.

955 M. H., Hyderabad. Please refer your query to the Registrar of Joint Stock Companies, Government Place, Calcutta.

956 K. S. M., Hyderabad. For leather goods enquire of Herfeld and Rettberg, Elberfeld and Otto Lielomann Offenbach a M. Waldstrasse 24 ; both of Germany.

957 D. P. S., Nawabganj. Communicate direct with Amrit Match Factory, Kota, Bilaspur. Umbrella merchants of Calcutta are : (1) Anil Kumar Dutt, 55, Harrison Road ; (2) City Import & Export Co., 42, Strand Road and (3) Satish Chandra Daw & Co., 142-1, Old China Bazar Street ; all of Calcutta.

958 A. C. D., Narayangunge. Sugar making machine may be had of B. D. Bery & Co., 43, Ripon Street, Calcutta and Duncan Brothers, 101 Clive Street, Calcutta.

960 G. M., Nowgong. Vocational education is imparted to students along with the general routine works in many schools of Calcutta, such as Maharaja Kasimbazar's Polytechnic Institute, 1, Nanda Lal Bose Lane and Saraswati Institute 69, Raja Rajballav Street, Calcutta.

961 K. C., Mhow. For the required machine enquire of Oriental Machinery Supply Agency Ltd., 20-1, Lal Bazar Street, Calcutta.

962 A. C., Jamnagar. Chemicals may be bought of B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta. Dyes may be had of Hansraj Vishran & Co., 13, David Joseph Lane and Aminchand Mehra & Sons, 34, Armenian Street ; both of Calcutta. Tallow may be had of Calcutta Tallow Mart, 19, Tiretta Bazar Street, Calcutta. Wax of various kinds may be had of S. N. De, P. O. Box 851, Calcutta and Bansi Dhar Dutta, 126, Khengraputty, Barabazar, Calcutta.

963 D. K., Gatora. Formula of laundry soap appeared in October 1923 issue.

965 S. N, Wazirabad. Match making machines may be supplied by Baden Engineering Works, Late Sebold Durlach, Germany and A. Roller, Berlin 20, Prinzen-Allee 24, Germany.

966 F. M., Achnura. Please go through September 1923 issue of INDUSTRY in which suggestions were given for starting small industries.

967 N. K. J., Almora. Particulars of preparing gas mantles will appear in an early issue. For the machine you may write to Oriental Machinery Supply Agency Ltd., 20-1, Lal Bazar Street, Calcutta who will indent the same on your behalf.

968 R. R., Sialkot City. Formula of rubber solution appears elsewhere in this issue.

969 R. G. S. M. A, Madras. To communicate with any querist please write him with number and initials under care of INDUSTRY when your letters will be duly redirected.

970 M. H. R., Lakhimpore. For arms and ammunitions write to Messrs D. N. Biswas & Co., Dalhousie Square, Calcutta.

Limitation of Family

2nd Enlarged Ed. Profusely Illustrated 46 Engravings 425 Pages Price Rs. 3 Postage Extra.

A comprehensive and Confidential Treatise. Every parent desiring to regulate the number of children according to his health and means' will find it a god-send, ask for table of detailed contents which will sent free. K. M. DASS & CO.,
29-1, Telepara, Sampooker St, Calcutta.

971 M. N., Monghyr. Homeopathic madicine may be had of N. K. Mazumdar & Co., 34, Clive Street, Calcutta.

972 R. I. W., Wazirabad. For the required machineries enquire of Oriental Machinery Supply Agency Ltd , 20-1. Lal Bazar Street, Calcutta. For the wheel required write to Calcutta Industries Ltd., 71, Canning Street, Calcutta.

974 D. H. B., Faizpur. We do not deal in any article.

975 G. A. B., Nagpur City. No apparatus is required for deadorising oil. For knitting machines enquire of W. Brady & Co., 26, Strand Road, Calcutta. For cardboard box making machine refer to No. 972 above. Glass wares may be had of Nando Lall Dass & Bros, 194, Old China Bazar Street, Calcutta.

976 M. G. A., Murree. For paper flowers enquire of Mr. H. Chakrabarty, 36, Central Avenue South, Calcutta.

978 M. M. M., Aligarh City. Stearine may be had of B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta.

979 D. N. B., Mailsi, Formula of cleansing aluminium utensils appeared in September, 1923 issue. So far as our information goes superfluous hairs cannot be permanently removed, you may however consult a physician.

981 V. D. S., Kolhapur City. A series of articles on Mail Order Letters appeared in the 1st and 2nd volumes of Commercial India. Initial capital to be invested depends upon the nature of business. Stamp collection is a hobby.

PILES.

Internal oa external. bleading or blind, recent or chronic. radically cured without any operation by the combined use of—
MOTIWALA'S VEGETABLE.
Pile specific Re. 1-4. Pile Ointment Re. 1 Laxative. Conserve Re. 1 and Tonic of Life for stopping hœmorrhages Rs. 3-8. (Post and Packing extra). One out of thousands of unsolicited tesimonials is given below :—
Mr. Sardar Prasad Sarkar, Dy. Magistrate and Dy Collector, Rajshahi. Bengal ; "I am greatly benefitted by **Motiwala's Piles** remedies."
D. B. MOTIWALA & SON,
Morland Road, Byculla. Bombay.

984 S. M. N., Bombay. Formula of tooth powder appeared in June 1922 issue of Industry. Formula of toilet soap will appear in an early issue.

985 A. S. C., No address. Fireworks may be supplied by Berliner Kunstfeuerwerkerel Deichmann & Co., Malchow b Berlin, Germany. For sulphur enquire of Seitaro Arai, 11, Itchome, Onoecho, Yokohama and Ataka & Co., 29, Gochome, Koraibashi, Higashiku, Osaka ; both of Japan. For glass nibs write to Nakatsuya Honten, 7, Kyuemar-cho, Kanda-ku, Tokyo, Japan.

986 P. C. & Co., Lucknow. Coal tar may be had of The Barakar Coal Co. Ltd., Sijua, Managing Agents Messrs Burn & Co., 7, Hastings Street, Calcutta. For the chemical required enquire of Calcutta Chemical Co. Ltd., 5, Bonfield's Lane, Calcutta.

987 H. N., Cawnpore. Please refer to a note regarding Indian Match Manufacturers' Association that appears elsewhere in this issue.

988 K. N., Bombay. For books on pisiculture enqure of Messrs Thacker Spink & Co., 3, Esplanade East, Calcutta.

989 S. B. S., Rohtak. Amritadhara being patent medicine its formula is not known.

991 S. F. B., Narnaul. Ice making machine may be had of Messrs Burn & Co., 7, Hastings Street, Calcutta. Necessary information regarding ice manufacture will be supplied by the above firm.

992 M. A., Rai-Bareili. Manganese occurs principally as the dioxide which constitutes the mineral pyrolusite, and is widely distributed. Baryta or heavy spar is one and the samething. Please explain the exact nature of the formula you want. Do you mean cement ?

993 M. M. V., Sheoraphuli. An article on rope making appeared in July 1921 issue of Industry.

996 B. M. K., Rangoon. Wants to buy refuse of cotton seed oils after refining called *Kitta* in Gujrati.

NOTICES AND REVIEWS.

Sate Amrit.

Messrs. Rama Bros., Echunian, Lahore have sent us a phial of the above claimed to be 'a Universal Cure.'

Neem Soap.

Medicinal neem soaps are being prepared by Messrs. Dhanraj Thakurdas & Co., Bunder Road, Larkana. They are efficacious against skin diseases.

Silver Tooth Powder.

We have received a sample of nice silver tooth powder prepared by Messrs. R. S. Basant & Co., 64, Gandhi Lane, Delhi.

Buttons and Medallions.

Messrs. Vasanmal Wattanmal & Sons, Jhooramal's Lane, Said, Hyderabad are manufacturing photo-buttons and photo-medallions, etc. which are decent, attractive and moderately priced. There are plain and coloured varieties some bearing emblems, others fascimile of leaders.

Homeopathic Institution.

The oldest and the foremost Homeopathic institution in India is the C. H. Medical College, 104, Cornwallis Street, Calcutta founded by the pioneers of Homeopathy in this country. Arrangements for teaching are quite satisfactory.

Match Industry.

Consult Match-Expert with long experience
in Europe, Japan and India
Please enclose stamps for reply :
Mr. A. P. Ghose, M S.C.I. (London),
42, Beniapukur Rd., Entally, Calcutta.

Papers and Pictures.

Some very beautiful coloured picture cards have been sent to us by Messrs. L. V. Kuppu Chetty, 56 Pycrofts Road, Triplicane, Madras along with a sample of metal polishing rag. The firm is representative in India for the journals : (1) Automobile Digest (2) Sportman's Digest (3) Export-Anzeiger.

The Railway Guardian.

Edited by Mr. T. S. Ramaswamy Iyengar, Office, Srirangam, Trichinopoly Dist.

The above monthly journal has been started under the auspices of the Railway Grievances Redressing Association for India to safeguard the interests of the Railway passengers, merchants, railway subordinates and others.

Magic Writing Pad.

It is a novel memo-pad which can be written upon with any pointed article. The writing can be rubbed off easibly and the surface can be used over and over again. It may be had of Messrs. T. Lackshminarayana Chettiar & Son, Genl. Merct., "Lakshmi Vilas", Hospital Street, Tiruvadi Post Office, Tanjore District.

A Serviceable Diary.

We are indebted to Messrs. Walter Potts & Co. Ltd, Bank Chambers, 329, High Holbora, London, W. C. 1 in respect of a neatly bound serviceable diary with useful appendix. The firm manufacture iron and steel products, galvanised sheets, asphalts, rosin, tar and pitch etc. and specialise in cement. Their representative is Mr. S. C. Bhattacharji, 11, Clive Row, Calcutta.

Manual on Architecture.

Saral Gathan Tatwa in Bengali. By Babu Saileswar Sanyal, B. E. Publishers, The Book Company, College Square, Calcutta. Price Re. 1, only. Ph. 165.

It is with deep pleasure that we welcome the publication of this manual on architecture. The subject matter has been treated comprehensively and elaborately, nothing of importance in the building trade having been left out. Moreover, the arrangement is very systematic while the examples and computations are valuable. On the whole therefore the work will serve as a handy reference book. The author deserves our thanks for having enriched the Bengali language by writing this technical manual in the vernacular.

Bread and Freedom.

Edited by Captain J. W. Petavel, Lecturer on Poverty Problem, Calcutta University and Principal, Kasimbazar Polytechnic Institute, Baghbazar, Calcutta.

The Journal advocates a sound educational system of which co-operative production is the prominent feature. As a practical remedy for unemployment the establishment of educational colonies is suggested, the guiding principle of which will be 'earning while learning'. These are laudable objects calculated to mitigate the economic distress in the country. That the Journal is under the pilotage of Capt. Petavel, the versatile exponent of these schemes is recommendation enough for its wide circulation.

The Indian Match Manufacturers' Association.

We have been asked by the Secretary, Indian Match Manufacturers' Association, 122-1, Upper Circular Road, Calcutta to request all Indian manufacturers of matches throughout the country to supply him with the following items of information at their earliest convenience :—

1. Name of the Factory with full postal address.

2. Capital, invested in the industry.

3. Average monthly outturn.

4. Number of hands employed—

(a) Number of salaried hands.

(b) Number of men doing work on contract, if any.

5. Average cost of production, per gross.

6. Average selling price per gross.

7. Approximate profit earned per gross.

8. Names of match wood available in the province concerned.

The Secretary assures us that all these information will be treated as strictly *confidential.*

In view of the growing menace in the shape of Swedish competition Indian match manufacturers should certainly form into a representative association to voice their demands, ventilate their grievances and protect their interests. To carry weight the members must work conjointly and express their opinion unanimously.

General Order Supplying Nursery

The best house for placing orders.
If you are in need of anything,
please to book your order with

DATTA, BOSE & CO.
23, Ram Rattan Bose Lane, Calcutta.

Trade Enquiries.

[Letters to the parties are to be addressed by number and initials under care of INDUSTRY when these will be duly redirected]

773 L. N, Komarapalayam. Wants to be put in touch with dealers in cloths of Ratnagiri.

793 S. B., Kheri. Wants a financiar to finance Rs. 200 for starting a lucrative business.

797 A. G. C. & Co., Madras. Wants to be put in touch with all the grocers of Madras Presidency.

839 A. G., Masulipatam. Desires to buy bitumen powder.

840 N. H. K, Kolhapur City. Wants a translator who can translate Urdu books into English.

850 B. D., Alwalpore. Wants an expert in ink manufacture.

875 M. C. J., Perambur. Desires to be put in touch with lungi dealers of Madras.

879 R. N., Impham. Can supply bear's fat.

891 G. Rai Sharma, Berlin S. W. 11, Mockemstrasse, 135, Germany. Wish to be put in touch with exporters of rice, specially Burma rice.

911 B. S. J., Rohtak. Wants a financier with Rs 5,000.

923 K. C. R. .C., Barisha. Can supply brooms of coconut fibre and tamarind in very large quantities.

941 N. N. J., Chitaldroog. Wants to buy sambal.

949 K. Jethmull, Post Restante, Cairo, Egypt. Desires to be introduced to merchants and manufacturers in India to deal with Egyptian merchants.

959 C. H. T. P. W., Cawnpore. Requires an expert who can advise in tin printing.

980 J. J. & Sons, Jodhpur. Can supply soapstone, mica, kaolin, gypsum and graphite.

988 K. N, Bombay. Wants to be put in touch with dealers in peori dye.

1017 S. J. S., Yeotmal. Desires to be put in touch with dealers in Mangalore and Shahabad stones.

July Issue of Industry.

(In the Press)

The July issue of Industry will be a special number dealing exhaustively with the Cotton Industry in India. Besides it will contain technical articles in addition to Formulas, Small Trades, New Ideas and other useful features. Any friend of our subscribers may get a copy free as sample on application to Manager, INDUSTRY, Shambazrr, Calcutta.

INDUSTRY

Is a monthly Journal of Technology and Handicrafts, Science and Commerce, Agriculture and Business. The rate of subscription is as follows:—

Indian Rs. 3. Foreign Rs. 5-4.

The charge is for complete yearly volume only, inclusive of postage.

Single Copy As. 5 only.

BUSINESS NOTICE.

Industry is published at the end of every month.

Subscribers are enlisted at any time of the year but they will receive only the number from April to March comprising a complete volume for one year's subscription.

At the time of sending a V.P.P. only the current number is generally sent. The previous issues of the volume are sent per book-post on receipt of the value of the V.P.P. For particulars and Advt. rate please write to—

Manager, INDUSTRY OFFICE,
Shambazar, Calcutta.

Managing Editor—Mr. K. M. Banerjee.

INDUSTRY

A Journal of Technology, Handicrafts & Commerce

Vol. XV. Calcutta, July, 1924 No. 172

Managing Editor — Mr. K. M. Banerjee.

The Fabric of Civilization

MATERIALS for food and for clothing, both equally necessary for man in a civilized state of society, are yielded in probably equal proportions by the animal and vegetable kingdoms. The flesh of various animals, wool and silk of different kinds being contributed by the former, as the cereal grains, pulses, and roots, with flax, hemp, and cotton are yielded by the latter, and form the food and clothing of millions of the human race.

But next to the grain of the cereal grasses, cotton is probably the natural product upon which the comfort and prosperity of several nations depend more than upon any other.

Indeed in many ways cotton stands out unique among all the plants that men grow. Not only is it the only crop which has greatly changed the destinies of nations and continents but it is unique in that it contributes to a greater variety of human needs than any other plant that Providence has placed upon the earth. Cotton, furthermore, is also unique in that more largely than any other plant it contributes to the higher wants of man. There has therefore been a tendency to regard cotton as a special gift of Nature destined to man's use.

In the first issue of the present volume we have treated the rice industry of India. It is but meet that we should deal with cotton industry of India in a similar fashion in the present number. One is the complementary to the other and the two together constitute the basic industries of the world.

It would not be far from correct to describe cotton as the central feature of the world's modern commerce. Neither is it probably too much to say that cotton is now the basis of the dominant industry of the globe. Cotton is the fabric of civilization. It has built up peoples, and has riven them apart. It has brought to the world vast and permanent wealth. It has enlisted the vision of statesmen, the genius of inventors, the courage of pioneers, the forcefulness of manufacturers, initiative of merchants and shipbuilders, and the patient toil of many millions. For these reasons it has been hailed as "King Cotton."

INDIA'S INDUSTRIAL PROGRESS.

India's Iron Ore.

In India, where coal and iron ore are comparatively near each other, opportunity exists to make iron on the spot or to export the ore. The latter course can never be as advantageous as the former to the country. Thus with abundance of iron ore of highest grade, cheap fuel, and labour, and railway freights, geographical convenience from the point of view of markets, and comparative freedom from the after-effects of the war India is sure to become ere long one of the greatest manufacturers of iron and steel, provided necessary and adequate facilities are granted against unfair competition.

Woollen Mills in India.

The number of woollen mills in India is small—about half a dozen, with a spindle power of about half a lakh and about twelve to fifteen hundred looms. The mills manufacture of all classes of woollen goods and their produce is largely absorbed within the country, although of course. from the nature of the climate, woollen materials are less in demand than cotton. The export of manufactured woollen goods is very small indeed ; it is composed mainly of special products, such as shawls, carpets, composed of a woollen pile on a cotton warp, or of a woollen warp with a silk pile.

Wireless Scheme of India.

It is stated that the Government of India has decided to support the establishment of a wireless service by private enterprise, and applications will be considered up to 1st August. It is required that the Company shall be registered in India, in rupee capital, and that at least 60 per cent of the capital shall be offered for subscription in India. Direct communication, in two directions simultaneously (i. e., with the United Kingdom or South Africa on the one hand, and Canada or Australia on the other) is to be guaranteed. It is to be hoped, therefore, that the Indian link in the Imperial wireless chain will be established before very long.

Preparing Groundnut.

Groundnuts are produced on an immense scale in India, and in the preparation of this product for the groundnut oil industry growers are turning more and more to mechanical decorticators. It is reported that manual labour injures the kernel but, on the other hand, groundnuts prepared by the use of decorticating machines are undamaged, and as a result sell for a better price. Part of the hand method has consisted of moistening the nuts and beating them with sticks, to separate the brittle shells from the kernel, and this has frequently caused the oil produced to become rancid.

Agricultural College in Burma.

An Agricultural College and Research Institute has been established at Mandalay. The course will be two in number, or two years' certificate course and a four years' diploma course. Negotiations are proceeding for the affiliation of the college with the Rangoon University and it is expected that affiliation will be granted soon, in which case the Degree of Bachelor of Science in Agriculture will be conferred on students who have completed the four years' course and successfully passed the examination for the degree. It is expected that a certain number of government stipends will be awarded.

Chutnies.

(*By a Practical Expert.*)

CHUTNIES constitute the soul of food. They make up any deficiency in culinary manipulation and make even unprepossessing eatables toothsome. They are much liked by Indians and Europeans alike and there is a brisk trade in it. Chutnies are of two kinds : one that can be bottled and preserved and the other prepared freshly and used up in 3 or 4 days. The former varieties are generally intended for home consumption while the latter are usually made on a large scale for ceremonial feasts. These are marked with asterisks. To preserve them indefinitely put into wide-mouthed bottles, add 1 oz. of rectified spirit (60 o. p.) to each bottle and then seal hermetically. The containers must be put out in the sun from time to time.

Much of the remarks made in connection with the Preparation of Pickles in our last issue applies equally, as well as many of the instructions to be followed hold good in this case also.

A few words about the spices are, however, necessary. They may be sifted through a fine sieve, if desired. The cumin seeds are first baked and then powdered. The chillies are pounded. The gingers are peeled and bruised. In some cases *kagzi* lime is preferred to *pati* lime.

One advantage in the preparation of chutnies is that they are readily made and do not require elaborate cooking.

ALU BUKHARA (THE PLUM).

Plum	1	sr.
Lime juice	1	sr.
Salt	2	ch.
Black pepper	1	ch.
Cumin seed	1	ch.
Raisins	4	ch.
Dry dates	4	ch.
Almond	4	ch.
Cardamom, minor	½	ch.
Mint	2	ch.
Ginger	1	ch.
Sugar	half of the total amount.	

First clean the plums and soak them in the lime juice overnight. Next day mash them and strain through a piece of cloth.

New mix all the ingredients thoroughly, sun the mass for three days successively and bottle. Bring out the bottles in the sun from time to time.

The almond and mint must be brayed before addition.

PODINA (MINT).

Podina	1	ch.
Tamarind pulp or Lime juice	½	ch.
Chilli	2	,,
Salt	q.	s.

First bray the podina, chilli and salt together and then add the lime juice or tamarind pulp. A little oil and sugar may be added as a dressing if desired. In the proper season brayed green mango may be added as the sour ingredient instead of lime or tamarind.

GRAPE.*

Grape	1	sr.
Lime juice	1	sr.
Dry dates	4	ch.

Dry ginger	2 ch.
Red pepper	2 ch.
Cumin seed (baked)	1 ch.
Ginger	1 ch.
Sirka	1 ch.
Sugar	half of the whole amount.

First wash the grapes and soak them for 24 hours in the lime juice. Then mash them and strain through a piece of cloth. Next bring the sirka to boil and pour the grape juice into it. Add the dry dates and then gradually the other ingredients. Bring down when the whole thickens and bottle when cool. Place in the sun from time to time.

ORANGE.

Oranges	50
Rose water	½ sr.
Curdled milk (sweet)	4 sr.
Salt	q. s.
Dry ginger	4 ch.

First peel the oranges and remove the fibres and seeds from the cells. Then take them in a porcelain or enamel vessel together with curdled milk and salt as much as desired. Mix these ingredients thoroughly and then incorporate the rose water. Finally sift over the fine powder of dry ginger. If sweet curdled milk may not be available some sugar may be added to the sour curdled milk.

RIPE MANGO.

Mango pulp	1½ sr.
Lime juice	½ sr.
Cardamom, minor	¼ tola
Black pepper (powdered)	1 ch.
Cumin seed (black)	1 ch.
,, ,, (white)	1 ch.
Sugar	1 sr.
Salt	4 ch.
Sirka	½ sr.

Choose the required number of good sweet mangoes, clean, peel, mash and strain the pulp through a piece of cloth. Hold the pulp in a porcelain or enamel vessel. Add the lime juice and mix the other ingredients save the sirka which is to be incorporated last.

GREEN MANGO

Green Mangoes	20
Sugar	1 sr.
Black pepper (powder)	1 ch.
Cumin seed (Black)	1 ,,
Salt	4 ,,
Fenugreek	1 ,,
Sirka	1 sr.

Wash the mangoes clean, peel, and pound them. Then add the sugar and mix the spices. Lastly incorporate the sirka and bottle. Place in the sun from time to time.

TAMARIND (RIPE)

Ripe Tamarind	1 sr.
Sirka	1 ,,
Sugar	1 ,,
Salt	2 ch.
Dry ginger	4 ,,
Cumin seed (black)	1 ,,
,, (white)	½ ,,
Fenugreek	½ ,,
Chilli	1 ,,
Ginger slices	4 ,,

First bake the spices and powder them. Then mash the tamarinds in half seer of pure water strain the pulp through a cloth. Next cook it in an enamelled vessel and add gingers, sugar and salt. After a time add the sirka and continue boiling until the mass thickens. Take off from the fire and on cooling strew over the other spices. Finally bottle and cork airtight.

RAISINS

Raisins	1 sr.
Lime juice (Kagzi)	1 ,,
Salt	4 ch.
Pepper	1 ,,
Cumin seed	1 ,,
Alu bukhara	½ sr.
Almond (paste)	½ ,,
Cardamom, minor	½ ch.
Sugar	1 sr.

First carefully clean raisins and alu bukhara and soak them overnight in the lime juice. Next morning mash them well and strain through a cloth. Mix the other ingredients and sun for 3 days. Then bottle. The almond must be brayed into paste and the cardamom powdered.

BLACKBERRY

Blackberry juice	1 sr.
Salt	2 ch.
Sirka	1 sr.
Lime juice	½ ,,
Sugar	1 ,,
Pepper	1 ch.
Cumin seed black and white	1 ,,
Mango ginger	4 ,,
Dry ginger	4 ,,

First cook sugar and lime juice together. Then add sirka and bring to boil. Next add blackberry juice and thicken. When tepid warm strew over the spices and bottle.

The berries should be fully ripe [illegible] big-sized. The mango ginger should pounded.

GREEN PAPAYA *

Papaya slices	1 sr.
Lime juice	1 ,,
Sirka	1 ,,
Sugar	1½ ,,
Mango ginger	4 ch.
Cardamom, minor	1 ,,
Chilli (fried)	2 ,,
Cumin seed (white)	1 ,,

First pare the green papayas, cut them into four. Remove the whitish seeds and other internal matter. Wash them and cook in lime juice and sirka until tender : then add the sugar and the other ingredients.

PEAR

Pear	1 sr.
Ripe tamarind	½ ,,
Sugar	1 ,,
Cumin seed	1 ch.
Salt	2 ,,
Pepper (black)	1 ,,
Sirka	1 sr.

First pare the pears and cut them into thin longitudinal slices. Then cook the pieces in water until soft. Drain off the water and allow to dry, next mash the tamarind in water strain its pulp through a cloth. Bring to boil this juicy pulp and add the pear slices. Then add sugar and gradually the spices. Finally add the sirka and remove.

DRY MANGO PULP

Mango pulp	1 sr.
Sirka	1 ,,
Lime juice	4 ch.
Mango ginger	2 ,,
Salt	2 ,,
Black pepper	½ ,,
Cumin seed (black)	½ ,,
,, (white)	1 ch.

Take dry mango pulp (ambsatta) of the best Madras variety. Soak it in sirka for 24 hours. Next strain through a piece of cloth and add freshly pounded mango ginger. Finally add the other ingredients and remove when thick.

PINE APPLE. *

Pineapple pieces	2½ sr.
Salt	4 ch.
Sugar candy	1 sr.
Black pepper	2 ch.
Fenugreek (whole)	1 ch.
Cumin seed (black)	1 ch.
,, ,, (white)	1 ch.

The pineapples must be big-sized and fully ripe. Pare them, cut to pieces and pound. Besmear the mass with salt and place out in the sun. When the secretions have dried up besmear with powder of sugar candy and again dry in the sun. Then incorporate the remaining ingredients.

CAULIFLOWER *

Cauliflower	½ sr.
Tamarind (ripe)	2 ch.
Sugar	½ sr.
Salt	1 ch.
Lime juice	4 ch.
Sirka	4 ch.
Chillies	1 ch.
Dry ginger	2 ch.
Cumin seed, (black) (white)	½ ch.

Prepare the cauliflower in such a way that the stems are rejected and the flowers are only kept. Then mash the tamarind in 4 ch. of water and strain the pulp. Next cook the cauliflower pieces in the tamarind juice and add gradually salt, lime juice, sirka. Remove the mass when it thickens and add the powdered spices.

DATES.

Box dates	100
Sirka	1 sr.
Lime juice	½ sr.
Salt	4 ch.
Cardamom, minor	1 ch.
Black pepper	1 ch.

First bring to boil the lime juice and sirka, add the dates and salt. Remove when well-cooked and add the spices.

GLOSSARY.

Almond—badam.
Blackberry—Kalajaum.
Black pepper—marich.
Cardamom, major—bara elaich.
,, minor—chhota elaich.
Cauliflower—ful kobi.
Chillies—lanka, mirchi.
Cumin seed—black kala jeera.
,, —white sada jeera.
Curdled milk—dahi.
Dry date—khurma, chhoara.
Dry ginger—sunth.
Dry Mango pulp—ambsatta.
Fenugreek—methi.
Ginger—ada.
Lime—lebu.
Mango—am.
Mango ginger—amada.
Mint—podina.
Orange—kamla lebu.
Papaya—papita.
Pear—naspati.
Pineapple—anaras.
Raisins—kismis.
Salt—laban, nun.
Sugar candy—misri.
Tamarind—tentul, imli.
The Plum—alu bukhara.
Vinegar—sirka.

1 sr. = 16 ch. = 32 oz. = 2 lb.

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Tobacco Pipes.

THE manufacture of tobacco pipes can be carried on a cottage industry scale. The ingredients are not many and the equipment is small. There is a regular market for this article of necessity and a few hundred rupees will suffice to start a factory.

Tobacco pipes are made of clay, white and coloured earths, porcelain, ivory and various other substances. The tobacco pipes which are commonly used are formed of a fine plastic white clay, which is called from this application pipe-clay. After being purified and made into a soft dough, the clay is cut into small pieces, each enough for one pipe. Each piece is kneaded thoroughly upon a board, and rolled out to nearly the form and size of a pipe, with a projecting bulb at one end for the formation of the bowl. These pieces are laid aside for some time to dry, and when the clay is sufficiently firm, they are subjected to the curious process of boring. The workman takes the roll of clay in his left hand and with his right inserts the end of an iron needle, previously oiled in the small end of the roll, and by dexterous management thrusts the needle through the whole length of the roll without penetrating the surface. The bulb is then bent into the proper position to form the bowl, and the piece of clay, with the needle remaining in it, is pressed into a mould to complete its form. The moulds are made of metal, in two halves. The bowl is partially hollowed by the finger, and completed by the insertion of an oiled stopper or mould. The wires are now withdrawn, and the pipes are taken out of the moulds, slightly smoothed over, and laid aside to dry. After drying for a day or two, any remaining roughness is removed by means of an appliance made of hard wood. The pipes are sometimes moulded for a second time and polished with a piece of flint bored with holes, through which the stem is passed repeatedly. The pipe-stems are thus far straight but before going to the kiln they are slightly bent. A typical smoking pipe bought from the bazar may well serve as a model for the above purpose.

A suitable kiln for burning the tobacco pipes (to convert the clay into porcelain) consists of a large but very light cylindrical crucible, with a dome-shaped top, and a circular opening in one side for the insertion of the pipes. This crucible is mounted in a brick furnace, lined with fire brick in such a manner as to leave a space of about four inches all round for the circulation of flame. The pipes are placed in the kiln, with their bowls against the circumference, and their ends supported at a considerable elevation upon circular pieces of clay set up in the centre. By this arrangement one furnace may hold fifty gross pipes, which may all be baked within 8 to 10 hours.

As to the availability of pipe-clay in India it is stated that a fine bed of it occurs between Terani and Karai. Pipe clay has also been mentioned as a product of the Madras forest. The clay used in the ornamental pottery of Karigeri in North Arcot is said to be form of pipe-clay.

Grind Stones.

ABRASIVE wheels are used for an immense variety of purposes, to meet which a wide range of different qualities, shapes, and sizes is required.

There are two distinguishing characteristics, viz., fineness and hardness, either or both of which admit of variation in adapting the wheel to the class of work to be done. The 'fineness' or size of the grains of the grinding material is expressed by the number of meshes per square inch of the sieve through which they will pass, and this number is referred to as the 'grit' or 'grain' of the wheel. Again, 'hardness' as applied to grinding wheels, is understood to refer to the quality of resistance to disintegration. To form a wheel, the sharp, angular particles of the abrasive, or 'grit' must be embedded in some binding material, or 'bond' for cementing them together. After the particles have become dulled by the act of grinding, they must be allowed to break away in order to keep the wheel sharp. Emery and carborundum in fine powder are the abrasive materials generally employed for making grindstones.

The various processes of manufacture are distinguished chiefly by the substance employed to cement the grains together. The essential feature of the 'bond' is that it shall wear away about as fast as the grains themselves. Moreover it must not be affected by water used in grinding, or by the produced by grinding. The various cementing materials usually employed are : (1) glue hardened with tannin ; (2) vulcanite or hard rubber ; (3) asphaltum ; (4) celluloid ; (5) shellac ; and (6) silicate.

Now wheels produced by either of of the first five processes are known as composition wheels and are not very satisfactory. They are liable to the defect of gumming or or glazing, as the bond takes little or no part in the operation of grinding. A more scientific and efficient process is to employ a cementing substance which may be fused or burnt during manufacture, and which therefore possesses some value as an abrasive. Vetrified wheels produced in this way are porous and easily penetrated by water without being injuriously affected. As all grinding should, whenever possible, be performed wet, this is a very valuable property. Lastly in some cases the quality of elasticity is indispensable. This is best attained with wheels made by the shellac process. The products are therefore known as elastic wheels.

Carborundum and alundum wheels are produced by three different processes known as vitrified, silicate and elastic of which the first has proved to be the most satisfactory. It is therefore commonly in vogue. The grit is mixed with bonding clay of the proper consistency, is run into moulds, and when sufficiently dry to handle, the wheels are placed in a kiln and subjected to the temperature at which the bond vitrifies, for a period of from six to twenty days, depending on the size.

COTTON INDUSTRY OF INDIA.

Introductory.

LONG before the dawn of history the cotton plant was cultivated in various parts of the world and the earliest records of the processes of spinning its fleecy "bolls of wool" into yarn and of weaving that yarn into clothing, are of such antiquity as to make it difficult to obtain satisfactory evidence of their beginnings.

India being one of the earliest civilized countries, and having an ancient literature still in existence, it is interesting to discover the period when cotton is first mentioned, either as a natural product, or as used in the art of weaving. The earliest notice which we know of this substance is in that most ancient digest of law, the Institutes of Manu, written 800 years before the Christian era. There cotton is mentioned so often, and in snch a way, as to indicate that it must have been long in familiar use by the people of the country.

The Father of History in his account of India says, "the wild trees in that country bear fleeces as their fruit, surpassing those of sheep in beauty and excellence : and the Indians use cloth made from these trees." There can be no doubt that India is the early country of cotton even as China is of silk, and Egypt of flax.

Indeed the use of cotton in India dates back to pre-historic times. It may be stated that from 1500 B. C. to about the same number of years after the Christian era, India was the centre of the cotton industry, and the cloth which was woven in a rather crude and primitive manner has rarely been equalled for fineness and quality. Cotton was introduced into China and Japan from India, but its adoption by these countries was slow.

Cotton also appears to have been indigenous to Central, and northern South, America, where its use was well known at the time of Columbus, whilst it still grows wild in Africa. In fact there is abundant evidence to show that a knowledge of the plant and its industrial possibilities is quite as ancient in the New as in the Old World.

The development in the cultivation of this plant, mainly for the purpose of clothing the people of the world, is one of the romances of modern times. The world's fields now produce cotton of an annual value of hundreds of millions of pounds sterling and millions of people get their livelihood in the production and manufacture of a commodity which, it is estimated, provides clothing for nine-tenths of the world's population.

THE WORLD'S COTTON.

Cotton is the most important of all fibres. It is employed for the manufacture of the greater part of the clothing material of all nations, and has become vitally necessary to every civilised community. The plant is grown over enormous areas, and its cultivation gives employment to millions of people.

The areas under cotton cultivation are mainly subtropical, the few exceptions being China, Korea, Turkestan. The subtropical areas include practically the whole extent of the crops in the United States, Russia and China, with portions of the Mexican, Indian, Persian and Egyptian areas as well as the limited cultivation of cotton in Mediterranean lands (Greece, Italy, The Levant and Algeria). Among the long list of cotton growers within the tropics are Mexico, many West India Islands, Colombia, Venezuela, Brazil, Peru and Ecuador, French and British, West Africa with Nigeria and the Sudan East Africa (Tanganyika and Uganda), Portuguese Colonies, the Peninsula of India, the Dutch East Indies and Queensland.

Although cotton is grown in so many places, most of the world's commercial supply is obtained from three countries — the United States, India, and Egypt. The United States produce about six-tenths of the world's supply, India about two-tenths, Egypt one-tenth, and all the rest of the world together only the remaining tenth.

For all the countries for which data are available the aggregate surface under cotton averaged, during the three years 1919 to 1921, 58,495 thousand acres as compared with 59,848 thousand during the five previous years and 59,760 thousand in the pre-war period 1909 to 1913.

Taking into account all the ascertained data the production of cotton averaged, during the years 1919 to 1921, 8,124,000 thousand pounds as compared with 8,551,000 thousand pounds during the period 1914 to 1918 and 8,910,000 thousand pounds, the average of the five years 1909 to 1913.

The consumption of cotton in the various countries of production has not been very definitely established in any statistical form. Some of the lesser growers export their entire crop, while others, such as India, manufacture a very large percentage, and China must be supposed to deal with almost all its production, in view of its immense population, ordinarily clothed in cotton fabrics.

Economic conditions have so greatly disturbed the cotton trade all over the world that any estimate of consumption might prove very misleading.

The Cotton Plant.

Cotton belongs to the order of the Malvaceae, or mallows, its generic name being Gossypium. Experts in systematic botany differ greatly as to the number of separate species which can be distinguished, but the following are generally recognized.

A. GROUP OF OLD-WORLD, OR ASIATIC COTTON.

(1) *Gossypium herbaceum.*

This includes most of the Indian and Levant cottons, and the native types of Russian Turkestan and Persia.

(2) *Gossypium arboreum* or tree cotton. Although tree cottons are found in other sections also, this name is usually restricted to a type resembling the Asiatic, and includes the sacred tree cotton of India.

B. TWO GROUP OF NON-ASIATIC COTTON.

I. The Upland Group.

(3) *Gossypium hirsutum* is so called from the hairy character of the plant, on stem, leaves, and seed. The American Upland is the chief representative of the group, to which Cambodia cotton also belongs. The group is possibly also Asiatic in origin, though its most important cultivation is now in the New World.

II. The Peruvian Group.

(4) *Gossypium barbadense, maritimum, and peruvianum* This group includes the Sea Island, Egyptian, Peruvian, Caravonica, and other cottons. The exact origin of these forms, which include the best kinds of lint on the market, is uncertain. They might also be roughly distinguished as the "vine-leaf" cottons.

WILD AND CULTIVATED FORM.

The cultivated cottons of the world have been referred to three great areas : (a) Asia, (b) Africa, and (c) America. But it has sometimes been affirmed that the two first can be taken together and spoken of as the fuzzy-seeded Asiatic, and the other as the naked-seeded American cottons. This, however, is most inaccurate since all the fuzzy-seeded species are certainly not Asiatic, no more than are all the naked-seeded American forms. A more accurate conception will be ; namely, fuzzy-seeded cottons with united bracteoles and fuzzy-seeded cotton with free bracteoles. The former is the Asiatic group and the latter the American fuzzy-seeded. Moreover the wild species have the seeds either with a firmly adhering coat of wool or a readily separable floss. And even the condition with both a fuzz and floss is not unknown in a few wild species, or at all events fully acclimatised or feral states.

It may not be out of place to mention here a few of the features of the wild cottons. They all have, for example, a red coloured woolly coating on the testa of the seed. In some this assumes the condition of a short dense velvet, called the fuzz. In others there are two coats of wool—an under-fleece (the fuzz) and an outer coat, the wool proper or floss. In still a third there is no fuzz, but a distinct floss.

The first and most convenient eye-mark of cultivation is accordingly the production of a long white floss in both the fuzzy-seeded and naked-seeded forms.

BOTANY.

The usual distinctions of the cotton plant are, 1st. Tree Cotton ; 2nd. shrub C. ; 3rd. Herbaceous C. ; of each of which there are several kinds, —the plant having a great tendency to run out into varieties.

The plant if left to itself grows to a height of from six to twelve feet, sometimes shooting straight up and bearing its flowers at the top of its stem, and sometimes sending out many branches sideways, which in their turn bear flowers and send out other branches, so that the final shape of the plant is that of a pyramid.

The leaves are large and either three- or five-lobed. The flowers occur singly in between the stem and the base of the leaf-stalk. They resemble those of the hollyhock and mallow, having five overlapping petals which are usually sulphur yellow in colour with a blotch of purple at the base.

The small calyx is completely hidden by three large tooth-edged bracts which are at first dark-green but afterwards change to brown. The stamens are very numerous, and are joined together to form a tube, which is joined on to the base of the petals. The tube is dotted all over with slender filaments which support the yellow anthers. The style has a three- or five-lobed stigma which passes from the seed vessel through, and some distance beyond, the staminal tube.

The fruit consists of a green capsule or boll containing numerous dark-brown seeds, each covered with long, white, flattened, and twisted hairs. The capsule is surrounded at the base by the three tooth-edged bracts. When the fruit is ripe the capsule bursts open and discloses a mass of white fluffy material. This is the cotton of commerce.

THE BOLL.

The cotton plant is a perennial shrub, but it is usually treated as an annual. The flowers of the shrub vary considerably in colour according to the species. But whatever the colour of the flower, the subsequent history of the cotton plant is the same. When the petals fall the fruit remains enveloped in the calyx, but gradually increase in size, when it is called the "boll." When the "boll" is ripe the outer covering splits exposing the cotton, which now that it is no longer restrained expands rapidly and forms a large fluffy "boll." When the "boll" has opened completely and is dry, the cotton is ready for gathering.

Inside the boll of fluff are the actual seeds of the cotton plant. So long as the cotton fibre is still adhering to them the product is known as "seed cotton."

The first process is that of "ginning," by which the cotton fibre, now called "lint," is removed from the actual seeds. This "lint," constitutes the "raw cotton" of commerce.

STOCK IMPROVEMENT.

There may be said to be three methods of improvement of stock.

First, systematic selection of forms that appear spontaneously in the fields, and which seem better suited to environment or possess some special quality such as being blight-resistant, or manifest a desirable property such as superiority of fibre. Second, natural and artificial hybridisation of species and races along lines calculated to secure an intermingling, strengthening and fixing of points of merit. Third, acclimatisation of approved stocks from one country or locality to another.

DISEASES AND PESTS.

The numerous diseases which attack the cotton plant may be divided into three classes.

Diseases due to physiological causes such as Mosaic disease, Red leaf blight, Shedding of bolls, Angular leaf spot.

Fungoid diseases such as Wilt or frenching, Cotton leaf blight, Mildew, Cotton boll rot, Anthracnose, Root rot, and Insect pests such as Cotton boll worms, Cotton boll weevil, Cotton worms, Cut worms, Locusts, Cotton stainers, Cotton aphis, Leaf-blister mite.

The Cotton Fibre.

DEFINITION.

Cotton is the downy substance found in the seed capsules of plants of the species Gossypium. It grows out of the seed, and is therefore a seed hair, consisting of a single cell. The seed is covered with a very coarse, generally yellow, brown or dirty green under-wool, whereas the valuable cotton hairs are much longer and for the most part colourless.

Cotton is produced within pods which protect it from injury by dust or weather, until it is ripe and fit to be gathered. It is of a white or yellowish white hue, possesses downy softness and warmth, and its delicate fibres are sufficiently long, flexible, and tenacious to admit of being spun into a fine thread.

THE FIBRE.

The cotton fibre is a single, elongated, conical, epidermal cell, the upper extremity of which is closed, whilst the lower end, which was attached to the seed, is broken off irregularly. Under the microscope the fibre appears as a granular striped band, mostly twisted in the shape of a corkscrew.

CHEMICAL PROPERTIES.

In its chemical composition cotton in common with the other vegetable fibres, consist essentially of cellulose. On the surface there is a protecting layer of more or less wax and oily matter, and also in the fibre there is a trace of pigment, which in some varieties of cotton becomes quite emphasised.

In reality the purified cotton fibre as it exists in bleached material is practically pure cellulose, and this compound alone appears to be essential to its structural organisation.

The natural impurities present in the raw cotton fibre amount to about 4 to 5 per cent. and consist chiefly of pectic acid, colouring matter, cotton wax, cotton oil, and albuminous matter. The fibre gives about 1 per cent of ash on ignition.

Church and Muller have made careful analyses of raw cotton with the following results.

Cellulose	91.35
Hygroscopic water	7.00
Wax and fat	0 40
Nitrogen	0.50
Cuticular tissue	0 75
Ash	0.12

PHYSICAL PROPERTIES.

The natural, spiral-like twist present in the cotton fibre causes the latter to be especially adaptable to purposes of spinning. The spinning qualities of the cotton fibre, however, depend not only on the nature and amount of twist which causes the individual fibres to lock themselves firmly together, but also on the length and fineness of staple. These three qualities in general will determine the character and fineness of yarn which may be spun from any sample of cotton.

In its tensile strength cotton stands between silk and wool ; whereas in elasticity, it is considerably below either of the other two fibres. Cotton is less hygroscopic than either wool or silk.

There is no substitute for cotton that can be cultivated on a large scale, no substitute, animal or vegetable product, with which civilization's present demand for clothing could be supplied.

Cotton fibres even from the same seed, vary considerably in length and relatively in diameter, and only approximate measuremente can be given. The diameter of a cotton fibre varies from 4/10000 to 10/10000 of an inch, and the length of the fibre from $\frac{1}{2}$ inch to $2\frac{1}{4}$ inches. It has been estimated that there are 140,000,000 fibres in a lb.

INDUSTRIAL USES.

The many uses to which the cotton fibre is now applied have enormously enhanced its commercial value, and strengthened the demand for its increased cultivation.

To regard cotton only as the raw material for the clothing of mankind would be a serious misconception. The bulk of the world's cotton crop is used for this purpose, but its employment does not now end here. The introduction of mechanical appliances has greatly extended the utility of the fibre, and to-day we cannot overlook or ignore its application to science and to the arts, and other interests foreign to the cotton industry, in the narrower sense of the manufacture of cotton clothing Chemically treated, cotton is a powerful explosive ; mechanically treated, it is a highly inflammable material. It is used on the battlefield as a destroying agent, it is to be found there among the healing agencies. Air craft, for its structure, draws upon the best qualities of cotton and steam has not altogether displaced it in the sailing craft. Cotton is extensively used in medicine and surgery ; the imagination of the artist is revealed upon it ; it is indispensable to the motor manufacturer ; it is used as a covering for electric and telephone wires ; even dwelling homes are largely furnished with it. Cotton is a very adoptable material, and therefore a commodity of the greatest value, and the trade in it has reached gigantic dimensions.

Scientific discoveries have enabled cotton to be so treated that it appears almost exactly like silk. Cotton too has successfully competed with wool.

CLASSIFICATION.

Cotton is usually classified according to the length of the individual fibres into three main groups : -

"A"—Long staple.
"B"—Medium staple.
"C"—Short staple.

Long staple cottons are from $1\frac{1}{2}$ to $1\frac{1}{4}$ inches in length ; medium from 1 to $\frac{3}{4}$ inch, and short from $\frac{5}{8}$ to $\frac{3}{4}$.

The grade and price of cotton are regulated by the following characteristics—length of staple, fineness, strength, colour, cohesiveness, and regularity in all its features also by the amount of leaf, sand, seed, neps, shell, and immatured fibres contained in the sample.

The longer the staple, providing the fibres are regular in length, the finer the fibre with the least percentage of the above defects, and the higher the price of the cotton.

Some of the principal defects found in cotton are : Variation in length of staple ; variation in diameter of fibre ; weak fibres ; rough, harsh intractable staple ; bad colour ; insufficient lustre or bloom ; large percentage of sand, dirt, leaf, shell, seeds, small pieces of broken seeds with fibre attached to them, neps, dead and unripe fibres, also fibres with few helical twistings owing to the cotton being grown under bad conditions. All the above defects have a deteriorating effect upon the value of cotton.

VALUE OF THE FIBRE.

For its general excellence and merchantable quality cotton depends most intimately on the length and character of its fibres The length of fibres is known in commerce as the "staple," and varies in different localities of the world's cotton belt from 0.5 to 1.65 inches ; the shortest staples growing in India and the longest in the islands about the coast of Florida, on cotton known as "Sea Island."

Preparation of Cotton.

GINNING.

The process of removing the cotton or "lint" from the seed is known as "ginning." In the United States, the cotton used to be picked off the seeds by hand. Very primitive implements have been employed for the purpose in India and are still used in many districts. One of these is a simple wooden roller, worked with the foot on a flat stone slab on which the seed-cotton is placed, the seed being thus pressed out from the cotton. Another is the so-called "charka" gin which, in its simplest form consists of a rough wooden frame containing two parallel rollers set close together ; the upper roller is fixed whilst the lower is rotated by means of a handle. In some forms, the two rollers, which are either both made of wood or one of wood and the other of iron, are both movable and are made to revolve towards each other by means of a crank or wheel at one or both ends. On pressing some of the fibres of the seed-cotton between the rollers and turning the handle, the lint is drawn through and pulled off the seed, which being too large and hard to pass through, remains behind and falls to the ground. Various forms of this machine are found in different parts of India, the amount of cotton produced by a day's work with it is not more than about five pounds. All these troublesome methods were, however, obviated by the invention of the American saw-gin towards the end of the eighteenth century.

THE GINS.

The saw-gin consists essentially of a series of notched, circular, thin steel discs or "saws" which are fixed on a cylinder. The cylinder revolves in a box, one side of which consists of a grating of steel bars between which the saws rotate. The saws project from $\frac{1}{2}$ to $\frac{3}{4}$ inch beyond the grating, and grip the fibre as the seed-cotton is fed on .

to them. As the saws revolve, they pull the cotton off the seed and draw it into the box with them whilst the seeds remain behind, the openings being too narrow to admit them. Immediately beneath the cylinder carrying the saws is a rapidly revolving brush which takes off the lint from the teeth of the saw as it enters the box ; a blast of air then carries the cotton into the condenser at the rear of the gin.

There are two kinds of gins in use at the present day, namely, roller-gins and the saw-gin described above. The latter can effect ,the separation of the lint more rapidly than the former, but is more liable to injure or break the fibres. In the case of the smooth-seeded kinds of cotton the lint is easily detached, whereas in the fuzzy-seeded varieties, the fibre is very firmly attached to the seed, and considerable force is required to remove it. For these reasons, saw-gins are used for the shorter and fuzzy-seeded varieties such as the American upland kinds, whilst the longer, finer and smooth-seeded cottons, such as Sea Island and Egyptian, are ginned by means of roller-gins.

Roller-gins are of two kinds. One of these is constructed on the principle of the old Indian "charka" gin and consists essentially of two rollers, which rotate in opposite directions. The cotton is drawn between the rollers, whilst the seed is held back by means of a steel plate. The second kind of roller gin is that known as the "Macarthy" gin, and is now much more largely used than that described above. In this case the seed-cotton is brought into contact with a revolving roller covered with rough leather. The lint clings to the leather and is thus torn away from the seed, it is then drawn between a steel plate, known as the "doctor knife," and a blade called the "beater," which moves up and down immediately behind the fixed plate and parallel to it Whilst the fibre is held by the roller the beater detaches the seed from it. The lint is carried over by the roller and delivered at the other side of the machine, whilst the seeds drop through a grid into a box placed beneath it.

PRESSING AND BALING.

After the cotton has been ginned, it is collected and made into bales. Great pressure is usually applied in order to reduce the bulk as much as possible before shipment. In former times, the baling was effected by very simple means, but elaborate machinery is now employed for the purpose. The following are the approximate weights of the principal bales which appear in the English market. United States, 500 lb. ; Egyptian, 700 lb. ; Indian 400 lb. ; Brazilian, from 200 lb. to 250 lb.; Peruvian, between 170 and 200 lb. The bales are usually more or less rectangular in shape.

Cotton in India.

Various species of cotton are found wild in India. The numerous kinds in general cultivation can probably be referred to G. herbaceum, G. neglectum, G. roseum, and G. arboreum. They may be more broadly grouped into (a) varieties which take at least eight months to come to maturity, and (b) varieties which ripen in about five months.

The varieties of the first group are grown as 'dry' crops and are suited only for districts which possess deep moisture-holding black soil or which have a prolonged rainy season. These late-ripening varieties, would, in most seasons, fail in the north of India, where the December cold would arrest or destroy growth. The plants are bushy and prolific. The length, quality and percentage of lint are fair or good, according to local conditions. The majority produce lint which is suitable for yarn of twenty to forty counts. The proportion of lint to seed is over 40 per cent in the best Broach, and under 25 per cent in the worst Madras varieties. Inferiority is largely due to impoverished soil, careless cultivation, and neglect in selection of seed.

The varieties included under group (b) are much more numerous than those included in (a) and are generally grown mixed in far greater confusion. They are widely cultivated in every Province except Madras. With the exception of a very few varieties of the Hingangbat or Bani type, they produce cotton which is short and coarse, but pure white in colour. Tha coarsest and shortest of this cotton is suitable for mixing with wool, and for this purpose is at present worth more than cotton of better quality. It is in keen demand for export to Japan and the Continent of Europe. The proportion of lint to seed in the coarse varieties is high, ranging from 30 to more than 50 per cent. In almost all varieties the plants are tall with few side branches and flowers, and individually are not productive. The cultivation of varieties producing inferior lint has extended, because they are hardy and can be grown on light soil, which is unsuitable, without irrigation, for the late-ripening finer varieties of the Broach type. The quick-ripening varieties can be grown without much risk in years of short rainfall, and good yields are obtained in average years.

DETERIORATION.

It is often stated that the cultivation of cotton in India has deteriorated in recent times. As already observed, the growing practice of separating the seed from the fibre in ginning factories, instead of as formerly by hand gins, has tended to injure the quality by mixing up seed, in many parts of the country. There can be no improvement unless the seed sown is at least equal to the average of the previous crop. The plant which produced lint suitable for the historic Dacca muslins does not now exist, or has greatly deteriorated. The Hinganghat Cotton of thirty or forty years ago was longer and silkier than that which is now produced, while Broach and Surat cotton are considered by some not to have maintained their ancient reputation, although higher cultivation is practised in those districts than elsewhere in India.

EXOTICS.

The only exotic cotton which is now cultivated to any appreciable extent in Madras is Bourbon cotton. It was introduced more than 100 years ago, and is now raised upon a few thousand.

acres in the Coimbatore District. The crop is not grown unmixed, and the lint sells at less than other Madras varieties. An acclimatized American variety has been grown for more than thirty years in the Dharwar District of Bombay. Its cultivation was at one time extensive, but is now declining. Upland Georgian has been thoroughly acclimatized at the Nagpur Government farm, and a stray plant can be seen here and there in many fields in the Central Provinces, but there is no general cultivation. Several varieties of the 'upland' type have been acclimatized on the Cawnpore farm, but their cultivation has not extended in the United Provinces. Indian cultivators have not taken kindly to exotics because, even when acclimatized, they are more risky to grow than indigenous varieties being liable to damage from insect attack, heavy downpours of rain, drought and the like. Acclimatization also causes deterioration of the lint. Experiments have, in short, proved that newly introduced exotic varieties do badly or fail, on black soil in any part of India and in an unfavourable season, succumb far sooner than indigenous varieties in any kind of soil. The adaptability of exotic varieties when acclimatized may possibly be proved for the drier portions of the Indo-Gangetic plain, where, as in Bihar, the rainfall is moderate and well-distributed, or where, as in wide areas of the United Provinces, the Punjab and Sind, deficient rainfall can be supplemented by cheap irrigation. Exotics do much better on alluvial than on black soil.

CULTIVATION.

To generalise on cotton growing in India would be unprofitable, for the climatic and soil conditions of this vast country vary perhaps more than in any other country in the world.

About half the total area under cotton, is in Bombay and Berar ; the other half consists mainly of about 1600 square miles each in Madras, the Central Provinces, the United Provinces, and the Punjab. Bengal, Assam, Burma, and Sind have each, in normal seasons, not more than about 160 square miles under cotton. The area in Berar and the Central Provinces proper has rapidly extended in recent years.

In Peninsular India the most suitable soil for cotton is the black cotton soil, which is a deep dense clay. The crop is also extensively grown on mixed black soils of no great depth. The most vigorous and productive crops are grown on the deep black soils of Broach and Surat. The cotton plants which grow on the impoverished black soils of Madras are poor in comparison. The alluvial soils in the Indo-Gangetic plains produce larger plants and a greater outturn than the black soils of any part of India. On black soil cotton is usually grown alone, or with lines of *arhar* (cajanus indicus) or jowar. On alluvial soil it is commonly mixed with arhar and maize or jowar. In the alluvial tracts there is no systematic rotation. On black soils jowar is the principal rotation crop, and cotton is usually grown every second year.

In the most backward parts, cotton is sown broadcast on land carelessly prepared, and receives little weeding; but in the best cotton tracts the cultivation is most careful, reaching its highest form in the Broach and Surat Districs of Bombay. For good cultivation tillage begins, usually in the hot weather, by working a heavy scarifier which grubs up the stubble of the previous crop, scrapes the surface, and fills in the cracks.

Such manure as may be available is applied in May. The plough is used after the first monsoon rain, and is usually worked several times, preparatory tillage being completed expeditiously to admit of sowing in June. A tworowe drill, with coulters 20 to 22 inches apart, is used for sowing. The seeds, owing to the fuzz on them cling together, and are prepared for sowing by mixing with a thin plaster of cow dung mud, and water, which when dry passes readily through the seed bowl and tubes of the drill. The usual seed rate is 10 to 15 lbs. per acre. The seed is drilled in accurately straight equidistant rows. On account of damage from rain on the heavy black soil, two or more sowing are often necessary before satisfactory germination is secured. The crop is generally handweeded once or twice. Inter-culture with the bullock-hoe begins when the seedlings are about 4 inches high. The weaklings are thinned out gradually; and finally the strongest plants are left 18 inches or 2 feet a part in the rows if the crop is healthy and vigorous, but much closer if the young plant are backward or stunted from any cause. The final operation is to pass the plough between the rows in September-October. This prevents the black soil from cracking too early, and thus helps to conserve moisture.

OUTTURN.

The plants begin to produce flowers in October, November and Cotton picking begins in January and last until March or April. Four or five pickings are necessary. The second and third are the most important, and from these the best seed for the following season is obtained. An average yield from liberally cultivated black soil is about 400 lb. of kapas (seed and lint) per acre. In the Deccan the outturn is much less; and in the alluvial tracts of the north of India, particularly with canal-irrigation, it is considerably higher. The cotton picked yields probably on an average throughout India 20 to 33 per cent of lint.

MARKETING.

By far the largest proportion in the Indian crop is sent to Bombay, where it is mostly stored in the open air on the Bombay "Cotton Green." Hundreds of thousands of bales are lying in stocks neatly packed, but entirely unprotected from the weather and not sufficiently protected against fire.

FRAUDULENT PRACTICES.

Flagrant fraudulent practices are carried on in Berar and the Central Provinces in connection with the damping of cotton for the purpose of increasing the weight of the bales. Saltpetre and seed cotton are used in the north of Madras Presidency. The mixing of different kinds of cotton before ginning and the mixing of various cotton and of waste cotton from the spinning mill are in vogue in some places. These should be stopped by legislation or otherwise and the intentional depreciation of the quality of cotton by the admixture of inferior kinds and dirt should be made criminal offences.

SEED FARMS.

The system adopted by the Central Provinces of having two or more "nucleus" seed farms owned by the Government and a large number of smaller seed farms owned by intelligent cultivators, spread all over the Province appears to be the most essential means for improving the staple and of increasing the yield. Such seed farms are especially required in the Bombay Presidency, in the Punjab, and the United Provinces.

In The Provinces.

BOMBAY.

Cotton growing tracts in the Bombay Presidency fall into five divisions :

(i) the area comprising the greater part of Noth Gujrat, the adjoining tracts of the Baroda State and the greater portion of Kathiawar where the trade variety *Dholeras* is produced ;

(ii) Southern Gujrat, including the Broach and Surat districts in British territory and the Navsari district in Baroda where Broach cotton, the barometer of the Indian cotton trade, is grown ;

(iii) the Bombay Deccan including the districts of East and West Khandesh, Nasik, Ahmednagar and Sholapur, also the northern part of the Bijapur District of the Hyderabad State where *Kandesh* Cotton is cultivated ;

(iv) the Karnatak, comprising the districts of Dharwar, Belgaum and the greater part of Bijapur as well as the Indian States of Kolhapur and Sangli whence *Kumpta-Dharwar* is obtained ; and

(v) the territory to the left of Indus in Sind in the Nawabshah, Thar and Parkar and Hyderabad districts where *Sind* Cotton is raised. In parts of the Bijapur District *westerns* are also grown as in the Madras Deccan.

C. P. & BERAR.

The most important tracts are the four districts of Berar and the adjacent districts of Nimar, Wardha and Nagpur, the main varieties produced being (i) the *Berar* and *Central Provinces* type in Berar and western part of Central Provinces, (ii) *roseum* in Berar and the adjoining tracts, (iii) *bani* in the Hinganghat District and as a cold weather crop in the Chanda District.

HYDERABAD.

Two main varieties of cotton are cultivated—*buri*. and *bani*, which both come under the trade description of *Oomras*. *Buri* is said to predominate in the Adilabad, Nizamabad and Karimnagar Districts, while *bani*, alternatively known as *Hyderabad Gaorani*, is the most important variety in the west, particularly in Parbhani and Nander. In Raichur and South of Gulbarga the *westerns* cotton of Madras care found, while south-east of Warangal, *Cocanadas* are grown and as a mixed crop *Khandesh* also.

MADRAS.

The cotton growing tracts in Madras fall into three well-marked divisions—

(i) the Deccan table-land including the districts of Bellary, Anantapur, Kurnool and Cuddapah in which the *northern* and *westerns* are grown, the former cheifly in the two first named and the latter chiefly in the two last named districts ;

(ii) the Coromandel Coast including the uplands of Guntur, Kistna, Nellore and Godavari where *Cocanadas* are grown ; and

(iii) the Southern districts of Tinnevelley, Ramnad, Madura, Trichinopoly and Coimbatore where

(1) *Cambodia* (a variety of American upland) is grown on red soils, preferably well irrigated and

(2) *Tinnevelies* of which pure *Karungauni*, a variety selected by the Agricultural Department, is by far the most important variety grown on the black soils.

Uppam Cotton grown in the Coimbatore and Trichonopoly districts (and to a small extent in Salem) passes under the trade name of Salems.

THE PUNJAB.

Three tracts may be distingushed : (i) the territory lying north-west of a line drawn from Ambala to Hissar where *Sind-Punjab* Cotton is cultivated ; (ii) the Punjab Canal colonies in the districts of Lyallpur, Montgomery, Jhang, Shahpur, Gujranwala, and Multan where *Punjab American* is grown under irrigation ; and (iii) the territory South of a line from Hissar to Ambala where a variety of Bengals known as *South-East Punjab* is grown.

UNITED PROVINCES.

Though grown all over the provinces, the chief areas for cotton lie in the west in the Bulandshar, Muttra, Aligarh and Agra Districts. About one-third of the total crop is irrigated. The chief varieties are the (1) *United Provinces*, (2) *White flowered Aligarh* and (3) *Cawnpore-American* grown only in canal irrigated areas. Practically the whole of the cotton of the province is sold under the commercial name *Bengals.*

CENTRAL INDIA.

The main cotton growing tract lies in the Southern part of the western of the two detached areas of which the Agency is composed. Malwa cotton is grown on the Malwa plateau and elsewhere, the type known as Central India, both of which belong to the trade description Oomras.

RAJPUTANA AND AJMER MERWARA.

The cotton tracts of the Agency are in the east adjacent to those of the United Provinces and Central India. The cotton which belongs to the type known as *Rajputana* falls under the trade classification of *Bengals.* No long staple variety of cotton is produced.

MYSORE.

The chief areas are the Chitaldrug and Shimoga Districts, where the types of the adjoining districts of Bombay are produced, viz., Kumta and Dharwar-American. Most of the cotton grown satisfies the Lancashire definition of long staple.

BURMA.

The five chief districts, ,Thayetmyo Sagaing, Lower Chindwin, Meiktila and Myingyan in the dry zone, are devoted chiefly to wagale cotton which forms nearly seven-eights of the crop. On the borders of the dry and wet zones in the Thayetmyo and Prome Districts wa-gyi cotton is cultivated and in the Shan Hills, the type *Shan Hills.* Collectively the three varieties are called Burmans.

BENGAL, BIHAR, ORISSA, ASSAM.

In Bengal the chief producing areas are the Chittagong Hill Tracts, the Districts of Bankura, and Midnapore and in Assam, the Garo and Lushai Hills. The product of these areas is known as *Comilla* cotton. The acreage in Orissa is insignificant. In Bihar, the District of Saran and the Santhal Parganas have a great part devoted to the crop, and with the Ranchi District they produce the cotton called *Bihar and Orissa.* A variety known as Jathia is found in scattered parts of Bihar and Orissa.

NORTH-WEST FRONTIER PROVINCES.

The bulk of the crop is grown under irrigation in the Peshawar and Dera Ismail Khan Districts and is known in the trade as *North-West Frontier Province.*

INDIAN CLASSIFICATION.

The following classification of Indian cottons has been suggested by Mr. Gammie after careful investigation.

A. Rozi and Dev Kapas Group.

1. Gosypium obtusifolium Roxb.
2. ,, arboreum Linn.
3. ,, sanguineum Hassk.

B. Herbaceum Group.

4. Gossypium herbaceum, Linn.

C. The Jethia Group.

5. Gossypium intermedium,

D. The Bani Group.

6. Gossypium indicum Lank.

E. Jari and Varhadi Group.

7. Gossypium neglectum, Todaro.

F. Kil Group.

8. Gossypium cermeum, Todaro.

G. Dharwar American Group.

9. Gossypium Hirsutum, Miller.

The Indian cottons of commerce are classed in certain well-defined groups, distinguished by peculiarities of staple, and designated according to the localities in which they are grown.

The cottons may be roughly divided into early and late varieties. The early cottons are sown from March to June, and require five or six months to reach maturity. They include Bengal, Oomras and Hinganghat. These varieties are grown on light soils, and are usually produced as mixed crops showing wide variations in character. The late cottons are sown from June to October and yield a crop in about eight or nine months. They include Broach, Dholleras, Coomptas, Dharwars, Westerns, Coconadas, and Tinnevelleys. These varieties are usually found on deep, moisture-retaining, black, loamy soils, and are generally grown as comparatively pure crops of uniform character and consisting of definite races of the cotton plant.

QUALITY AND DRAWBACK.

Indian cotton never reaches the all-round excellencs of American cotton. The staple reaches from 0. 6 to 1.0 inch, and lacks the natural support of water, soil and air found so favourable in the United States. The best fibres are produced in Central India, where the rains from the monsoons are most abundant, reaching 30 inches during the growing period. In Bengal and Scinde the cotton plantations are deficient in water and humidity, and the staples seldom reach 1 inch. The fibres are thick, fairly strong, but harsh and inferior. Madras cotton growh about Tinnevelly and Trichinopoly is better, and bears thick fibres with a staple from 0 8 to 1.2 inches in length. The shrubs grow on islands swept by sea air and moisture, while the rainfall is also conducive to good crops.

It is now recognised by the Government experts and others that the cultivation in India of exotic types of long staple cotton (longer than indigenous kinds) must be confined almost entirely to the irrigated districts. Whilst long staple cottons can also be produced in a few non-irrigated tracts, it has been clearly demonstrated that, with the exception of Tinnevelly cotton in Madras and Broach cotton in Gujerat, the cultivation of long staple cotton in unirrigated parts is not economically sound, the cultivation of indigenous cottons proves more remunerative to the former in non-irrigated tracts, owing to the highest ginning outturn (percentage of fibre), to the higher yield per acre, to the less attention required. Nevertheless, the prospects of the production of long staple cottons in India are decidedly favourable in the following Provinces. Sind, Punjab, Gujerat, Southern Madras, and the Central Provinces. All who are interested in the cultivation of long staple cottons in India should look upon this as a definitely settled opinion, arrived at after many years of careful investigation. The prospects of an extension of the area for these cottons lie mainly in the irrigation of hitherto dry tracts.

Staple cotton of almost equal quality to Middling American, and in some cases superior, is grown in India in the following Provinces, viz., Madras, Sind, Punjab, Central Provinces, Gujerat, Dharwar.

Of late years, while the quality of Indian cotton generally has been greatly improved, there has been considerable extension of the area under cotton, especially through irrigation in northern India as well as in the Central Provinces, and there appears to be the promise of a much greater increase in the production of Indian cotton of good quality in the extreme south of rhe peninsula.

REMARKS.

There is not the least doubt that the cotton crop of India can be doubled without even interfering with the growing of food supplies. In the opinion of the Imperial Cotton Specialist of India, the yield per acre has already increased, and is gradually improving.

The extension of irrigation in several Provinces which is making rapid progress is another means of enlarging the area under cotton and notably of the long stapled cotton.

There is no cotton-growing country in the world outside India—not even the cotton-growing states of America which has such a happy combination of suitable conditions for the cultivation of cotton—fertile soil, excellent climate, a large agricultural population, and a great net-work of railways—but the population require the guiding hand of the Government in the development of this highly important industry.

CONCLUSION.

The fact that India has fallen far behind the United States in the volume and quality of its cotton crop is no test of its potentialities as a cotton-producing country. There is little doubt that cotton and cotton fabrics equal to the finest the world has produced have been grown and made in India.

It is all the more to be regretted, therefore, that India's present position in the world's cotton supply should be such a bad second.

It is safisfactory to know, however, that future prospects are more hopeful for it is clear from all the information available that, given reasonable cultivation and the development of irrigation facilities, India could both increase the output and improve the quality of her cotton crop enormously.

The area under cotton in India is now nearly 25,000,000 acres, and the total crop over 5,000,000 bales of 400 pounds each, or an average yield per acre of less than 100 pounds of lint, as compared with the average of nearly 200 pounds per acre in the United States, and 450 pounds in Egypt. It is now known that, under the best conditions, good cotton land will produce easily 1100 or 1200 pounds per acre. What a gulf between possibilities and actualities !

The quality of Indian cotton to-day is just as unsatisfactory. In staple it is largely under $\frac{1}{2}$ inch in length, while its condition as regards admixture of dirt, leaf, and trash, which constitutes the grade of cotton is very inferior.

The cotton industry may be divided, so far as its markets are concerned, into three branches—raw cotton, yarn, and cloth. The raw cotton and the cloth markets are at each end of the scale, and the yarn market lies between.

In this issue we have dealt with the first part comprehensively and we intend to accord the same treatment to the textile industry in a future number.

Miscellaneous.

COTTON SEED PRODUCTS.

The lint for spinning purposes is by no means the only product of the cotton plant. The industrial application of the cotton seed and its products are :—

LINTERS.—This is the name given to the short fibres or fud that clings to the seed after the long fibres have been removed in ginning. This short fibre is removed by special gins and either sold as linters for spinning purposes or made into batting (wadding).

HULLS.—These are the outer casings of the seed and are split off preparatory to expressing the oil. Hulls are largely used as cattle feed.

COTTON SEED OIL.—This is the most valuable bye product and is expressed from the meats which form the centre of the seed.

OIL CAKE.—After the oil has been expressed, the meats are left in the form a cake, which is broken into small pieces which are ground into meal. This is used either as cattle feed, or as fertilizer.

FERTILIZER.—The cake is broken and ground, then used either alone, or mixed with other substances, as a valuable fertilizer.

KAPOK COTTON.

The commercial product known as "Kapok" was originally obtained from the seed capsules of *Eriodendron anfractuosum*. It is produced principally in Java, and to a small extent in India. Kapok is imported into Europe and is very extensively used as an upholstery material. It is also used in surgery as a substitute for cotton wool.

Of Indian vegetable flosses those of the Bombax species closely resemble the floss of *Eriodendron* referred to above. *Bombax malabaricum*, the floss of which is known in commerce as Indian Kapok, is a large deciduous tree common throughout the hotter parts of India, Burma and Ceylon. The seeds afford the so-called red silk-cotton or *semul* cotton, a fibre too short and too soft to be spun, but useful in stuffing pillows, etc.

Kapok is too fine, light, smooth and slippery to be easily spun, unless used as an admixture with other flosses. It is reputed to be employed in France for the manufacture of soft non-conducting felts. It has been used very largely in England in the construction of life-belts, life buoys, etc , and that it is regarded as superior to cork or hair since much more buoyant, softer and cheaper. It is, however, in upholstery mainly that *kapok* has found its most important use. It is largely worked up for cushions, pillows, chairs, beddings, mattresses, etc, in Europe and America. For these purposes its non-hygroscopic character, its softness and resiliency render it peculiarly suitable. It is also less absorbent, less liable to harbour insects, and can be sterilised by heating at least three times without being seriously damaged.

The supplies of Kapok available on the Calcutta market are very erratic, depending considerably on the attractiveness of the price offered. Large quantities of Kapok are allowed to run waste in outlying districts, and in parts of the Central Provinces, Central India and throughout the lower reaches of the Himalayas only a fractional portion of the crop is collected.

SILK COTTON.

Calotropis gigantea, or the Swallow-worts, is known in the vernacular as *madar*, *akanda*, etc. It grows abundantly in Bengal, Assam, South India and elsewhere. This plant is said to yield guttapercha from the milky sap ; a strong fibre from the bark ; a useful floss from the seeds ; and a medicine from the root bark.

The coma of hairs or floss from the seeds constitutes one of the so-called vegetable silks or silk cottons. It is believed to give evidence of being unsuited for some of the purposes of the textile industries. In practical experiments it has been found that the staple was too short and too light for existing machinery, the latter property allowing it to be blown away. It is, however, a soft, very white floss, with a beautiful silky gloss, and has been repeatedly spun experimentally in Europe, and the textile produced much admired. Notwithstanding all this, no progress has been made in the utilisation of the fibre. In India it is largely employed for stuffing quilts, its lightness being of great advantage, and in upholstery it holds a recognised position, since pillows and cushions stuffed with it are said to be very cool and refreshing. It is also to some extent regularly spun and made into fishing lines and nets.

COTTON GRASS.

What is known as Cotton Grass is the endogenous Eriophorum comosum. This plant is very common in the N. W. Provinces of India, growing abundantly in the ravines on the sides of the mountains, and is to be had for the cutting. Its seeds are clothed at the base with a cotton-like substance, which is used for stuffing and wick-making purposes, as well as for paper making. The fibrous leaves are very extensively used locally for making rough, strong twine ; and very thick cables of it are employed for ropes bridges in the Himalayas. Though pretty strong when newly made, the ropes are not durable. Reports on its paper making qualities state it as being of about the same strength as esparto, and capable of making equally good paper.

CLASSIFICATION OF COTTON.

The following classification taking the different classes of cotton according to their quality or spinning, capabilities has been offered by Mr. J. A. Todd.

1. The best cotton of all is the true Sea Island. The total quantity of these crops is very small, but their value is very high, on account of their marvellous spinning qualities. The use of these fine yarns is confined to the very highest grade of fabrics and the finest sewing-cottons. They are largely employed in the Nottingham lace trade.

2. Next to these come certain grades of Sea Island grown elsewhere with which are included the best Egyptian grades such as Abbasi, Sakel, and Jannovitch. They are also extra strong, which has given them certain special uses of their own where strength and fineness are essential.

3. In the third grade may be placed the ordinary varieties of Egyptian cotton, Afifi, or Brown Egyptian, and Ashmuni, or Upper Egyptian cotton. Peruvian cotton comes very close to this class of cotton, and some of the best of the new African cottons.

4. The great bulk of the world's cotton supply, however, consists of the ordinary American Upland crop, which amounts to about 60 per cent of the whole world's supply.

5. The greater part of the Indian crop, however, is in a grade by itself, of very short staple and inferior quality. It is little used in Lancashire, but is largely employed in the local mills in India, in Japan, and also in most of the Continental spinning countries. Similar to the Indian crop in quality are certain of the native varieties of Russian cotton. Finally, the great unknown of the cotton trade, the Chinese crop, is probably, on the whole, of Indian quality.

RECENT INVESTIGATIONS.

The British Cotton Growing Association has been formed to promote, with the co-operation of the Government, the cultivation of cotton in the

British Empire, and to make England to some degree independent of the American supply.

The British Cotton Growing Association does not actually grow the cotton. Its aim is rather to encourage in that work the natives and settlers in the different Colonies and Protectorates; to develop large plantations and model farms, and to act as agents for the distribution of good seed; to train the natives in modern methods of agriculture, to educate them in the use of up-to-date implements, and to establish ginning and baling factories so that cotton when grown can be efficiently cleaned, handled and marketed.

The work of the British Cotton Growing Association has extended over a large area. Experimental and pioneer work has been done in India, East, West and South Africa, the West Indies and Australasia There was hardly a part of the British Empire, where the conditions offered any prospect of success, which did not receive attention from the Association agents.

The Indian Central Cotton Committee is the representative in India of The British Empire Cotton Growing Association. Its views on the subjects of cotton cultivation in India are therefore valuable.

The cotton position of India towards the close of 1923 has been thus summarised by the Secretary to the Indian Central Cotton Committee.

1. India consumes normally in her own mills rather more than half of the average commercial crop.

2. An attempt has been made to group Indian cottons according to the counts which they are suitable for spinning and the following tentative conclusions have been drawn.

3. Roughly 50 per cent of Indian yarn production is of counts of 20s and over, and this proportion tends to increase. Production of this class of cotton is but little above actual mill requirements, leaving only small exportable margin.

4. For yarns above 22s. cotton production appears to be adequate to mill requirements but the margin though apparently adequate is uncertain.

5. Indian production of yarn of counts above 32s is small and shows no distinct tendency to increase. For the small quantity now produced cotton is imported to an appreciable extent. The absence of suitable local cotton may therefore be a limiting factor.

6. The exportable margin of Indian cotton is almost all of the shortest staple. There is a definite established export trade in the finer Indian cotton which seems to be limited by the supply, though partly by lack of cleanliness in Indian cotton.

7. It is obvious that it would be to the advantage of the Indian spinner and grower alike if the exportable surplus of Indian cotton contained a larger proportion of cotton suitable at least, for spinning 20s. The grower would be producing a commodity more nearly equivalent to the general standard of the world's markets and would run less risk of a discrimination against.

short-staple cotton in years of large crops.

8. For some years three has been a world shortage of cotton of $1\frac{1}{4}''$ staple and upwards. The production of such cotton in suitable tracts would undoubtedly be a sound development. In the early stages the local demand from Indian mills would be a valuable asset and the export demand appears to be assured. There is also an acute immediate shortage of all cottons of $\frac{7}{8}''$ staple and upwards and there seems little prospect of the American crop recovering its former magnitude. An unrivalled opportunity exists for the development of staple cottons in India.

9. To a certain extent any advance in the quality of Indian cotton is an advantage. Even for low counts Indian mills now require better cotton than in the past. But to ensure that premium to the grower which is so important in the introduction of a new crop it is necessary that a certain minimum degree of improvement should be effected. It is suggested that except where conditions are unusually difficult it would be wise not to be content with minor improvements but to aim at producing cottons suitable for spinning 20s and over. In view of the general shortage of stapled cottons it would be most unwise to introduce into any cotton growing tract a cotton of lower staple than that at present produced. The general shortage of cotton throughout the world will enforce a certain use to short-stapled cottons in substitution for longer cottons. Such substitution is limited and unlikely to be permanent as production in new countries increases.

Statistics.

PRODUCTION.

Area and yield of cotton in each Province during 1922-23.

	Area (acres)	Yield (bales of 400 lbs each.)
Bombay	5023000	1132000
Central Provinces and Berar	4703000	1200000
Hyderabad	3813000	1116000
Madras	2323000	428000
Punjab	1417000	409000
United Provinces	659000	178000
Central India States	890000	216000
Baroda	585000	116000
Gwalior	523000	74000
Rajputana States	302000	76000
Sind	239000	103000
Burma	272000	45000
Mysore	85000	24000
Bihar and Orissa	80000	15000
N. W. F. P.	15000	3000
Bengal (including Tripura)	72000	17000
Ajmer Merwara	36000	15000
Assam	40000	13000
Delhi	2000	1000

CONSUMPTION.

The estimates given below relate to all the cotton growing provinces and States in India.

The total reported area under cotton was 21,077,000 acres in 1922-23 as against 18,451,000 acres in 1921-22, or an increases of 14 per cent. The total estimated outturn was 5,181,000 bales of 400 lbs. each which is 16 per cent. greater than the final figure for 1921-22. The following statement compares the estimates of yield for the years 1920-21 and 1921-22 with the sum of net exports and internal cousumption (in thousands of bales).

	1921-22	1920-21
	1000 bales	1000 bales
Exports	3170	2226
Mill consumption	2159	2078
Extra factory consumption (conjectural)	750	750
Total	6079	5054
Less imports	107	113
Approximate crop	5972	4941

YIELD.

The estimates of yield classified according to the recognised trade descriptions of cotton grown in the years 1921-22 and 1922-23 are given in the following table.

	1922-23	1921-22
	1000 bales	1000 bales
Oomras	2882	2449
Dholleras	488	455
Bengal-Sind	691	622
American Punjab	117	79
Sind	4	—
Broach	271	168
Westerns and Northerns	163	143
Cocanadas	55	42
Tinnevellys	141	134
Salems	23	17
Cambodias	130	91
Coompta-Dharwars	139	212
Comilas, Burmas and other sorts	77	73
Total	5181	4485

On an average the exports of raw cotton represent 33 per cent of the total value of raw materials exported from India. The extent of the trade depends primarily of course upon the exportable surplus which in its turn depends upon the general harvest in India, but the relation of textile activity in Europe, the United States to the supplies available in America and Egypt has such an important bearing upon the prices as to be a factor of scarcely less importance.

TRADE DESCRIPTIONS.

Descriptions of Cotton	Acres (Thousands)		Bales of 400 lbs. (Thousands)	
	1923-24	1922-23	1923-24	1922-23
Oomras—				
Khandesh	1,304	1,410	284	332
Central India	1,541	1,412	247	255
Barsi & Nagra	1,974	2,180	578	628
Hyderabad-Gaorani	1,400	1,439	500	451
Berar	3,320	3,356		695
Central Provinces	1,581	1,501	1,020	345
Dholleras	1,965	2,014	288	489

Bengal-Sind-				
United Prov.	652	652	215	182
Rajputana	406	396	02	102
Sind-Punjab	1,647	1,295	526	395
Others	85	85	17	16
American—				
Punjab	599	382	234	117
Sind	5	7	3	4
Broach	1,176	1,130	203	281
Westerns and Northerns	1,974	1,657	169	167
Cocanadas	254	279	50	55
Tinnevellys	617		167	141
Salems	201	1,048	26	23
Cambodias	360		151	130
Comillas, Burmas and other sorts	436	419	84	78
Coomta-Dharwars	1,501	1,130	221	189
Grand Total—	23,088	21,792	5,075	5,075

EXPORTS.

The exports of raw cotton from India by sea to foreign countries in the last four cotton years (September to August) were as follows (in thousand bales of 400 lbs. each) :—

Countries	1919-20	1920-21	1921-22	1922-23
	Bales (1,000)			
United Kingdom	149	38	07	223
Germany	95	238	270	245
Belgium	222	194	232	234
France	65	27	89	130
Spain	68	39	38	62
Italy	231	148	198	309
China	148	316	534	376
Japan	1,648	1,149	1,663	1,759
Other Countries	76	77	79	135
Total	2,702	2,226	3,170	3,473

Exports of raw cotton and cotton waste follow :

RAW COTTON.

	Quantity Tons	Value Rs.
1919-20	428330	586524010
1920-21	370585	416287590
1921-22	533802	539612797
1922-23	600397	709743381

COTTON WASTE.

	Cwt.	Rs.
1919-20	291212	8280230
1920-21	206218	5173050
1921-22	235661	4893027
1922-23	463668	9728206

COTTON MILLS.

Cotton Ginning, Cleaning and Pressing Mills in India.

Provinces	Number	Employees
Burma	28	3672
Bengal	7	1484
United Provinces	138	11638
Ajmer Merwara	12	1398
Punjab	179	11439
N. W. F. Pro-		52
Bombay	584	39260
Central Provinces and Berar	417	31106
Madras	193	15298
Central India	176	9218
Baroda	115	7843
Rajputana	25	3381
Mysore	4	108
Hyderabad	164	9026
Total	2043	144943

Often these mills are combined with rice mills, flour mills or oils mills. In some cases also they are combined with lime mill, saw mill, wool pressing mill, groundnut shelling machines. In others they are coupled with iron foundry, ice factory, repairing workshop, paint and varnish works, printing press.

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Arjan Khimji & Co, 11, Elphinstone Circle, Bombay.

Chamanlal Sarabhai Javeri, 311 Shroff Bazar, Bombay.

Goolabroy Shewbux 53, Cotton St, Calcutta.

Japan Cotton Trading Co. Ltd. D-3, Clive Bldgs, Clive St., Calcutta.

N. D. Mallick & Sons Bunder Road, Karachi.

Ralli Bros, Wood St., Karachi.

Manilal Mulchand Shah, Zampada Pole, Ahmedabad.

Dhunjeeshaw Hormusjee Vakharia, Station Rd. Broach.

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Cotton Trading Syndicate, Lahore, Punjab.

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H. M. Mehta & Co, 123, Esplanade Road, Fort, Bombay.

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Agriculture and Industries Conference, Bengal.

THE annual Conference of the Departments of Agriculture, Industries and Co-operation and of the Veterinary Departments, Bengal came off on the 4th and 5th July, 1924. Improvement of agricultural condition of the country is a crying need of the Province and unless an extensive cultivation is made on a modernised system, the miserable condition of the agricultural people cannot be improved. It is laudable therefore that the Conference was held to devise ways and means to ameliorate the condition of the peasant and the unemployed *bhadralog* class. Government patronage is the most important factor in attaining any amount of success in the matter and therefore it is significant that the Conference was opened by His Excellency the Governor of Bengal.

The Conference passed resolutions on the development of the co-operative societies, greater encouragement to the middle classes to adopt agriculture as a profession, to improve irrigation and conduct more extensive research into cattle breeding. Need for organisation of banking facilities for the building of small industries was also pointed out most strongly.

The actual tillers of the soil are often compelled to sell their product at the lowest rate to meet the demands of the landlords or *mahajans* simply because they have not got the means to wait for a rise in prices. Their interests need be safeguarded if the prosperity of the country is to be ensured. With this point in view the Conference have advocated that Supply and Sales Co-operative Societies should be organised to secure the best prices for all agricultural produce, such as jute, paddy, etc and that steps should be taken by the Government to encourage the formation of Agricultural Associations and to ensure their successful working. To alleviate the acute distress due to the general prevalence of unemployment, specially among the middle class people, the Conference re-iterated the slogan 'Back to the Land.' Adoption of farming as a profession by these people has been found to be a solution and the Conference has urged upon the Government to offer special facilities by way of loans, etc. to attract them into agriculture. So much about the important resolutions on co-operation and agriculture In the domain of industry as well the Conference pointed out the necessity of Government assistance to minor and rural industries, particularly with regard to loans and grants. The isolated instances of success in industrial field hold high promises of their multiplication, provided suitable help is forthcoming and it is certain that with the Government co-operation and assistance Bengal may come once more to be reckoned as a great Industrial country. In this connection the urgency of banking facilities and loans at low rate of interest was indicated and the Conference have concluded that a liberal policy of Government loans was essential for industrial renaissance.

We hope earnestly that atleast some of the thirteen resolutions on the card will be given effect to in right earnest and will not meet the fate of similar resolutions passed on previous occasions.

Suggestions for Self-Help.

Ideas for Small Capitalists.

Mr. Damodar Swaroopa Bhatnagar, Postal Clerk, Moradabad, sends us the following:—

1. The Government is offering now-a-days places tor keeping stalls in the verandahs of the Post Offices just like on the station platforms. Any man can easily by an outlay of say Rs. 200 to Rs. 500 stock articles, there, of daily use—stationery, newspapers and books, etc. etc. He can sell those articles at a nominally increased prices, after purchasing them from a local merchant at wholesale rates. This would save him an amount sufficient to maintain himself. A number of illiterate persons come to transact business in the Indian Post Offices. He can write letters and the like for them in return for which the latter would pay him some thing in cash as remuneration for the services rendered.

2. In these days of educational progress there are hundreds of thousands periodicals, weeklies and dailies in all the language generally spoken in India. Any one offering himself as an Agent to the publishers of those papers would do immense good both for himself as well as for the proprietors of the paper. He can easily sell these papers in his locality for which the proprietors and the publishers would pay something as commission which is generally offered at 25 per cent.

3. Promising cities are wanting in modern laundry factories. These factories would prove immensely useful both to the public and to the owner,

For Self-Supporting Students

1. If a student can get some money from parents, the best way in which he can utilise is to buy articles of daily use for students by that money and sell those articles to his fellow students at nominally increased price. He can impress his fellow students of his poor standing and I do not think the latter would feel paying a little more amount for a thing that they can have for a little less amount from other places. (By articles of daily use for students I mean articles of stationery—such as pen, pencils, rubber, ink and paper, etc.)

2. The student can do binding work. In order to make himself accurate and neat worker he ought first of all to bind his own books. When he finds no defect in them he can ask his fellow students to bind their books. This would cost him almost very little—something about one or one and a half anna but he can charge for one book 3 to 4 annas, for generally the binding charges are 3 to 4 annas and more.

3. Students of higher class, say, 8th to 10th can write letters and applications for illiterate and less knowing persons. They can work in the evening or morning at some big shop either as a salesman or a clerk.

4. Drawing students can draw pictures and sell them. We see that the Railway Companies and the like always require pictures for the covers of their quarterly times. It would pay much to a student if he makes out a picture showing any portion of a place or station or the like through which is passing a railway train. The pictures thus

drawn should be interesting as well as historical.

5. Science students, can easily prepare a battery of two cells and thin copper wire may be substituted for costly electric wire. With this battery they can do silvering and gold plating for small articles such as buttons and the like.

6. A student, when the annual examinations of his school are over, can go to his fellow students and ask for their exercise books. From the excercise books thus secured he can extract the blank papers, which may be utilised for making envelopes. The envelopes can be made out with a machine even. A paper cut to the size and design of a machine made envelope and folded will make a good envelope, which can be sold at the rate of As. 4 per hundred.

In following the above students should note that they do not hamper with their studies ; nor should they neglect them by being busy all the time along in order to earn more.

Occupation for Purdanashin Ladies.

1. The fair sex in general has a very keen and special taste for artistic handicrafts. They can easily follow this industry. The breast lace worn by children and ladies of European countries, in frocks are very paying. The price of the lace depends upon the design. To make a lace of very beautiful design will require much labour and hence bring more money, while a simple design would take less time and fetch less money. In these days of fashion there is a great demand for lace, and so any amount of it can easily be sold. A lady can work daily after dinner say for 2 to 3 hours which time she would otherwise spend in sleeping or gossiping. She can easily earn 6 to 8 annas a day by working the simplest design.

2. A helpless widow can easily earn her living by making papadams. No implements are required except (a) a roller and a plate ; (b) a pestle and a mortar which are very common in every house-hold. Papadams are made from flour of black, green and horse gram mixed in equal proportion. When a mixture is to be used the dals are first to be passed through the mills. For one seer of flour take ¼ annas worth of dried chilies, ⅓ annas cumin, ½ anna of salt, ½ anna oil (or ghee), ⅓ anna of a kind of soda. sold in the market by the name of eatable soda or soda for papadams. It is very easy to make them and then sell.

3. Women can easily make country plates for taking food by stitching leaves of trees. These plates are very commonly and abundantly required in feasts and the like. The leaves are cut when green, the main stalk removed and pressed under any weight for 4 to 5 days and then stitched with split thin broom sticks.

4. Sewing machines are very common in these days. They are available for cash or on hire—purchase system to be paid for by easy monthly instalments. Their mastery is very easy and they are of simple machanism. The art of sewing is taught by female canvassers directly to the females. In the

beginning the lady can start with baby's aprons, kurtahs etc. etc. In course of time other articles can easily be taken up.

5. An educated lady can take up teaching of girls and little boys of her neighbours. She can form so to say a sort of small teaching institute, where she can teach them specially to the former in addition to mathematics and mother tongue, working on needles and other domestic affairs such as cooking. If the lady knows English also she can better teach them English and the like. For all this trouble she can charge some fee from every student as compensation, which will easily suffice for her maintenance.

6. The Charkha System is very beneficial during the present time. It is specially advantageous to the individual herself and to the prosperity of the country. The yarn thus spun can be either sold in the market on articles of daily use made of it—if the lady knows anything of making such articles—as Durries and Newar, etc. etc. which are very easy to make at home and require no complicated machinery.

Occupation for Pardahnasin Ladies.

Mr. K. S. Besnet, Karauli State, Rajputana sends us the following.—

If ladies could utilise their spare hours in any of the following domestic industries it would not only somewhat lessen the burden of their male members (if any) but also solve the question of their own maintenance more or less.

1. In the season of fruits leisure time could be very well spent in a profitable work of preparing jams, pickles, chutnies, etc. which any local dealer would gladly purchase leaving a margin of profit to both the parties concerned.

2. Seeds of cucumber, pumpkin, melon and water-melon (these are generally thrown away by people as waste) mixed together with their external covering removed are sold at a very high price (3 to 4 rupees per seer) in the market.

3. Preperation of Barias (dry pulse cubes) is a well-suited work to widows especially. They command a great sale in the market and can be sold through a boy to any local dealer or to any other purchaser in the street.

4. Preparation of Mawa (Dried milk) is also another work which can be very well carried out by female members of a family. Any sweetmeat seller will gladly purchase.

5. It would be better if ladies know tailoring work. They could earn at least a rupee per day by sewing clothes for their *mohalla* people.

6. Educated ladies can take up the work of coaching children of their neighbours.

7. Hand spun yarn is the topic of the day. Ladies of our city generally earn their living by spinning out Charkha yarn; or grinding flour for others by handmill.

8. Then comes the fine art. For those who know the art of preparing laces, woollen banians, hoses, etc., it is not difficult to earn two or three rupees daily as the things command a large sale at high prices. Paper flowers and fans etc. also bring good income at the occasion of any fair or mela.

Small Trades & Recipes.

Removing Rust from Nickel.

Nickel-plated articles which have become dull can readily be restored by means of alcohol to which 2 per cent. of sulphuric acid has been added. The liquid is applied liberally, and after a few seconds is washed off with clean water. The surfaces are then rubbed over with a swab dipped in fresh alcohol, containing no acid, and finally polished with a dry cloth. This method, it is claimed, will give brilliance to the dullest piece of nickel-plating without damage.

ANOTHER RECIPE.

Prepare a mixture consisting of alcohol, 50 parts ; sulphuric acid, 1 part. Plunge the article in this bath for ten or fifteen seconds, rinse it off in cold water, and dip it next into rectified spirit. Dry with a fine linen rag or with saw dust.

ANOTHER FORMULA.

Stearin, 1 part ; ammonia water, 26 parts ; benzine 50 parts ; alcohol, 75 parts. Rub up the stearin with the ammonia water, and add the benzine and then the alcohol, and agitate until homogenous. Put in wide-monthed vessels, and close carefully.

Hair Tonic.

Beta-naphthol	10	grains
[illegible] hydrochloride	5	,,
Resorsin	10	,,
Bayrum	5	oz.
Water	upto 20	oz.

Hair Colour Restorers.

Lead acetate	2	drams
Precipitated sulphur	2	,,
Glycerin	6	,,
Rose water	8	oz.
Distilled water to make	[illegible]	oz.

Damp the sulphur with spirit and mix with the lead acetate and glycerine, then dilute gradually with the water.

To Preserve Mangoes.

The whole mangoes are allowed to soak in cold water for a few hours. They are then peeled thinly and the stones removed. They are covered with weak lime water which is drained at the end of one hour ; they are next placed in a preserving pan, barely covered with cold water, boiled gently for ten minutes and drained well.

The mangoes are replaced in the pan, covered with syrup, boiled gently until the sugar begins to crystallize ; when cool they are transferred carefully into porcelain jars or wide-necked bottles. During the first month the syrup must be examined from time to time, and if it appears at all thin it should be reboiled. It may be found necessary to repeat this process two or three times before finally corking and sealing.

Size for Bronzing.

A size for cloth, silk, etc may be made by taking a little honey mixed with thick glue. This is to be reduced to a proper consistency, and it then has the effect of giving a fine bright lustre.

SCIENTIFIC AND INDUSTRIAL TOPICS.

Electric Light for Complexion.

A new complexion improver consists of a mask receiving radiant heat from a 60 watt lamp and steam from a generator connected to any convenient lamp pocket. The mask is of aluminium, with a polished inner surface reflecting the heat rays upon the face. The moist heat opens the pores of the skin, stimulates the circulation, and gives relief to tired nerves. The effect upon the skin is declared to be most healthful and invigorating. With a white bulb, the electric light is claimed to destroy bacteria and serve as a tonic, but a blue light causes a restriction of the blood vessels, with a comfortable sedative reaction.

Machines That Prophesises Tides.

By turning the handle of a machine in the National Physical Laboratory at Teddington, the hours of high and low water at forty ports in India are accurately predicted for each day of the coming year. In the space of three or four hours this wonderful and delicately-constructed apparatus accomplishes work which would take an expert computer months to calculate.

In many Asiatic ports the two successive tides are very unequal, and they vary in height apparently quite irregularly. In these days of big ships there are few ports that can be entered, or left independently of the tide. The hour of high tide must be known in advance.

It is not only the moon that causes or influences the tides. The sun's gravitational attraction also plays a considerable part, and the water-level also depends to a greater or less extent upon the centrifugal force of the earth's rotation, the configuration of the coast, the rainfall, the winds, variations in the density of the atmosphere, etc.

In the Indian tide-predicator twenty-four different influencing forces have been sorted out and their effect reproduced mechanically by means of twenty-four cranks. These cranks control a pen which records a line on a roll of paper faithfully indicating the rise and fall of the tides.

Friendly Germs.

Out of about two thousand kinds of bacteria only about one hundred are believed to be harmful. Without the other nineteen hundred life on the earth would soon die out. We as well as the animals whose flesh we eat, derive all of our sustenance from the vegetable world. Plants require that the soil should contain humus, and humus is brought about by the decay of other plants, which in turn is caused by bacteria, or germs. Without humus, plants establish themselves very slowly, so that if we were to kill all bacteria no more decay would take place. The soil would soon be exhausted and we should all die of starvation,

In a more ordinary way there are many bacteria which are of use to us every day. They produce vinegar. Lactic acid germs give the flavour to butter. Germs help make cheese. They help digest the food in our stomachs. And, finally, they cause juices to ferment into alcohol.

Kaleidoscope.

The Kaleidoscope is a well-known optical toy invented by Sir David Brewster, by which an infinite variety of symmetrical and often beautiful coloured designs can be obtained. The ordinary kaleidoscope consists of a tube containing two glass plates or mirrors, which extend along its whole length and make an angle of 60 degrees with each other. One end of the tube is closed by a metal plate with a small hole at its centre, to which the eye is applied. At the other end are two plates, one of ground and the other of clear glass (this being next the eye), with a number of pieces of coloured glass, beads or other objects lying loosely between them. When the eye is applied to the opening, the mirrors produce a beautiful symmetrical pattern, and when the tube is turned about or shaken new images, always symmetrical, are formed.

One of the most practical application of this play thing has been to facilitate the work of the producers of conventional or decorative designs.

Waterproof Paper and Board.

A process has been patented for the manufacture of a water resistent paper or board, in which the paper is impregnated with a mixture of a wax soap, such as potassium or sodium cerotate, with a binding medium such as glue or casein alkali and formaldehyde and a filling substance such as barium sulphate, calcium carbonate or precipitated aluminium hydroxide. Coloured fillers such as metallic compound of aniline colours may be used. After drying, the surface is rubbed down and smoothed by calendering and the pores are closed in this manner. To produce a good insulator, the material is soaked in linseed oil, train oil, paraffine or other oil or fat before smoothing. A harder product is obtained by uniting two or more layers of paper with iron resinate or other lac-like substance mixed with a little oil, and impregnating and finishing the product as above described.

Fixation of Atmospheric Nitrogen.

A process for fixing free nitrogen is being perfected by the Fixed Nitrogen Laboratory of the Department of Agriculture, U.S.A One of the most important steps in any process is the development of a catalyzer whose purpose is to aid in the chemical reaction which takes place when hydrogen under pressure is combined with the nitrogen of the atmosphere to form ammonia. In this latter compound nitrogen is available for fertilizers. Of the several processes which have been used successfully on a commercial basis the direct synthetic ammonia process is apparently the most promising one. The problem involved in the synthetic ammonia process may be divided into two groups, first those which concern the process of making the hydrogen-nitrogen mixture employed in the process. The nature of the entire process centres about the catalyst, and depends largely upon its characteristics.

Creating New Fish.

The creation of new varieties of fish by the methods that have made Burbank celebrated in the vegetable kingdom is now looked forward to as possible. A Danish scientist has demonstrated that by keeping fish in water at a different temperature from that to which they are accustomed, after several generations he can produce individuals of a new type, modified in form and structure, especially in the number of vertebrae and the rays of the fins.

No other agency has the same result —neither ultra-violet rays, nor feeding, nor anything else. Only the temperature of the medium has an influence. It is nearly certain that we now hold a key that will permit men to create new fish as horticulturists turn out new flowers in greenhouses.

Radio Typewriter.

A typewriter operated by radio has been successfully demonstrated before a convention of newspaper publishers in New York. It maintained a speed of 65 words a minute, and it is claimed that 100 words a minute can be reached on it.

The typewriter was one of the standard 'printer' pattern used in American newspaper offices for the reception of telegraphic news.

It was operated, for the purpose of the demonstration, from a laboratory two miles away, where a series of news messages was "punched" on a tape.

This tape was fed into an automatic radio transmitter, which sent them out at terrific speed, in combinations of five Morse dots and dashes. Wave lengths varying from 60 to 150 metres were employed.

An "aerial" 60 feet long was hung out of the window at the receiving station, and although five powerful broadcasting stations were at work, in addition to numerous ship and shore stations, the typed message was received with marvellous accuracy.

Ambergris from Whale.

Ambergris, derived from the intestines of the whale, is found in lumps up to 300 lb in weight, either floating in the Tropic seas or cast up on the shores of Madagascar, China, and Japan.

The whole of the constituents of ambergris, being of a highly complicated character, have not yet been identified and isolated.

Ambergris was known in very early times, and was reputed to possess highly curative properties for certain diseases.

Its present high cost is due entirely to the uncertainty of the supplies, to its use in perfumery as a fixative, and to its highly pleasant and delicate musk-like odour.

Phonograph for the Deaf.

With the aid of the "dentiphone," invented by an American the pleasures of the phonograph are extended to persons hard of hearing. One end of an attachment carries the stylus which rests in the groove of the phonograph record, while the other is formed into a mouthpiece to be held between the user's teeth. The tones of the record then become audible to him, through the vibrations of the bones of the head which are set up—quite as many deaf people are enabled to hear ordinary conversation through an instrument that brings about such vibration.

It is reported that the device may be constructed from any suitable resonant material, such as steel, hard rubber, or numerous woods. While a stylus or needle of metal is desirable, favourable results have been obtained with styli of hard wood. The inventor does not confine himself, to the form or cross section illustrated. There must of course be a head of some sort to carry the stylus and at the other end a suitable mouth-piece : and near each end there must be a thin, flexible section—the one near the stylus helps the latter to follow the groove in the record, while the one near the mouth-piece is necessary to avoid shock and jar to the teeth. Between the two thin sections, the instrument may be of practically any cross-sectional figure whatever.

A Simple Spectrometer.

For many centuries the processes of making and refining metals were conducted by rule of thumb, but now-a-days they are becoming more and more strictly scientific. The manufacturer wants to know exactly what is going on in his furnaces; and for this purpose he uses instruments which register the temperature of the interior of the furnace. A companion instrument has now been brought out in Great Britain with the object of detecting the presence of certain materials in the furnace flames, thus indicating to the engineer how far the processes in the furnace have developed. The instrument is based on the familiar principle of spectrum analysis, and its main feature is that although it is very sensitive it is a robust and simple appliance which can be used very conveniently under working conditions. The instrument is almost as easy to use as a microscope, and it fits into a small wooden case. It is likely to be used extensively not only in the metal industries but by chemists in their laboratories.

Chipping by Electricity.

The chipping and cutting of such materials as marble, brass and copper is work which calls for a high degree of patience and skill if it is to be done by hand. The difficulty is to regulate the direction and force of the blow as to remove the desired piece of material and no more. The manual worker being limited to a comparatively few blows per minute, makes slow progress, and at any moment, he may damage the work, either by an error of judgment or as a result of muscular fatigue. These several risks and difficulties are overcome by an electrically driven chipping tool perfected by a British firm of engineers. A small electric motor, of about one-third horsepower, is connected to a flexible shaft which terminates in a hand grip, outwardly resembling an ordinary chisel. Inside this handle or casing there is a simple mechanism which causes the chisel head to deliver 2,000 blows a minute. The "stroke," or distance through which the chisel travels, can be adjusted to suit the nature of the work and, when the chipping has been completed, a small grinding wheel can be fixed to the flexible shaft in place of the chisel, so that a dead smooth finish can be imparted to the surface.

FORMULAS, PROCESSES & ANSWERS.

Chocolate Beans.

1247 B. G. D., Aden Wants to make chocolate beans at home.

The cocoa nibs (the bruised, roasted seeds, freed from husk and membrane) are ground in a mill consisting of stone or metal rollers, which are usually heated either by charcoal fires or by steam, so as to soften or melt the natural fat (cacao or cocoa butter). The warm, smooth paste which passes from the mill is then placed in a mixing mill and incorporated with refined sugar, and usually vanilla or other flavouring substance. The trituration is continued until the whole paste is converted into an entirely homogeneous mass, which is finally shaped by means of suitable moulds, into various forms, as blocks, loaves, tablets, lozenges, etc.

Lithographic Ink.

1067 B. C., Bombay. Requests us to publish how lithographic ink is prepared.

To prepare ink for lithographic purpose take :

Wax	20 oz
Shellac	1 lb
Mastic	10 oz
Tallow Pure	8 oz
Hard Tallow Soap	8 oz
Venetian Turpentine	1 oz
Lampblack	5 oz

The wax and the other ingredients with the exception of lampblack are melted by heating together and to this is then mixed the lampblack. This ink forms emulsion with water and can be used like water colours.

The preparation of lithographic printing ink follows. First of all mix together 8 parts each of tallow, soap and wax, 6 of shellac and 4 of mastic. Then add the necessary lamp black.

Guava Jelly.

324 S P. D., Dhubri. Requests us to give a good recipe for Guava Jelly.

Take 50 to 100 large ripe sweet guavas. Crush, and break them into small pieces. Place in an enamelled saucepan, and cover it with water. Bring to boil and, while boiling, mash up the fruit into a fine pulp. After the fruit is well boiled, take it down from the fire, and strain the juice through a piece of flannel or cloth. It is best to allow it to drip all night To every cup of juice add 2 cups of sugar, and boil once more. When the sugar is dissolved

Match Industry.

For the supply of the best match machines of the world—Roller's (Germany) apply to the Chief Representative for India & Burma—
MR. A. P. GHOSE, M. S. C. I. (Lond)
Consulting Match Expert,
42, Beniapukur Road, Entally, Calcutta.

strain it once more to remove all impurities of the sugar. Bring the sweetened juice to boil once more; continue the boiling, stirring all the time to prevent burning. When the juice thickens add one or two teaspoonfuls of isinglass, so as to still further thicken the jelly. Before removing from the fire, add the juice of 3 or 4 large ripe limes, and pour the jelly into tins or bottles. The guava pulp may be made into cheese, by removing the seeds and boiling it in thick syrup

Vulcanisation of Rubber.

1249 L. A. S., Ceylon. Wants to learn the process of vulcanising rubber.

The vulcanisation of rubber may be effected by dipping it in melted sulphur, by heating a mixture of rubber and sulphur, by treating rubber with a solution of sulphur monochloride, or by exposing it to the vapour of sulphur monochloride. In the second method the rubber is mixed with a certain proportion of sulphur, varying in practice from 4 to 40 per cent., according to the class of product required, and is then heated at a temperature usually ranging from 125° to 150° C. Only a portion of the sulphur actually combines with the rubber, the excess remaining in the vulcanised product as free sulphur.

In this process the combination of the sulphur with the rubber is greatly facilitated by the presence of certain substances, such as to litharge, slaked lime or magnesia.

In vulcanising by means of sulphur chloride the rubber is treated with a solution of this reagent in benzene, containing from 1.5 to 3 per cent. of sulphur chloride, or in special cases the rubber is exposed to the vapour.

Litho Transfer Papers.

1193 A. B., Boath. Wants recipes for transfer papers.

There are different kinds of transfer papers used in lithography of which those used in pulling transfers from stone and from copper plates are important. They are prepared as follows.

(1) Stone Transfer Paper. Take 18 parts flour, 12 parts plaster of paris, 1 part gelatine, 1 part starch. The plaster of paris is slowly added to water by sprinkling it from the hand and constantly stirred; if inclined to set or thicken more water is added. It is properly mixed for the required purpose when it will stand for some time and not "set" and when a thin film of water rises to the surface. This film of water should be poured off if there is a quantity. The flour is made into a smooth paste by first mixing in cold water and afterwards boiling, care being taken that it does not become too stiff or contain hard lumps. This is added to the plaster of paris and mixed as thoroughly as possible. The starch is made in the usual way and then added to the above mixture. The consistency of the mass is thinned by the addition of glycerine to that of cream. The whole is then passed through a fine muslin cloth and ready for use.

The paper to be coated with this preparation should be of a good printing. The composition is spread over the paper with a soft sponge or large brush, and afterwards smoothed with a broad camel hair brush. It should then be laid flat on boards to dry, not hung up.

(2) Plate Transfer Paper. The ingredients in this case are 12 parts flour, 12 parts plaster of paris, 1 or 2 parts starch, mixed into a composition and laid on the paper as described above.

Cleaning Old Lace.

943 C. R. S., Roapettah. Requires hints for Cleaning Lace.

Here is a French recipe for washing valuable lace. Dissolve some pure white soap in a pint of boiling water and add two tablespoonfuls of borax. When this solution is lukewarm, put in the lace, leave it to soak for several hours, press it until clean, then rinse it in clear warm water.

In the last rinsing water put a few pinches of borax to give crispness to the lace, which must be laid flat on a table between clean linen towels. Do not iron it ; but put a heavy weight on top to press it perfectly smooth.

Snow Cream.

873 R. R., Mahal Kalan. Desires to be informed on the preparations of Snow Creams.

1. It is claimed the following gives the skin a beautiful, smooth and fresh appearance, and at the same time serves to protect and preserve it. Take spermaceti 4½ oz , white wax 3 oz, fresh oil of almonds 18 oz. ; melt over a water bath and pour in marble mortar and stir briskly to prevent granulation. When the mixture becomes of the consistency of butter, triturate until it has a white, creamy appearance ; add gradually a mixture of double water of roses, 1½ oz. : odourless glycerine, 1½ oz. ; mix for 20 minutes, then add 15 drops of essence of roses and beat for about half an hour, when it will be ready for use.

2. Take white wax, 20 grams, spermaceti 25 grams, bleached expressed oil of mustard, 140 grams, rose water, 80 grams ; bleached expressed oil of mustard, 20 grams ; borax 1 gram ; rose oil, 6 drops. The wax and spermaceti are dissolved in the expressed oil of mustard by gently warming on a water bath, the mixture is then rubbed down to a fine salve. The borax is next dissolved in the rose water which has been previously warmed and is then incorporated with the mass. Finally the balance of the rose oil and mustard oil is rubbed up with the above mixture, when a smooth ointment will be obtained.

Washing Soda.

1029 K. C. B. R., Gujranwala. Wishes to know how Washing Soda is made.

Washing soda is chemically known as sodium carbonate. It is manufactured either by Leblanc's process or by ammonia soda process. The Leblanc process consists in melting together sodium sulphate (salt cake), coal or coke and limestone or chalk, when the sulphate is reduced by the carbon to sodium sulphate, which then reacts with calcium carbonate (chalk, limestone) to yield sodium carbonate.

To extract the carbonate from the mixture, the whole mass is lixiviated with water. Calcium sulphide being insoluble in water separates out. Manipulations however require great care.

According to the ammonia soda process carbon dioxide is charged under pressure in a strong solution of brine and ammonia is finally passed into it. Sodium ammonium carbonate is formed which being sparingly soluble in water separates out. This when heated is decomposed into sodium carbonate and ammonia can be used up again in charging the water.

Soft Solders.

1068 D. C. I., Bhavnagar. Requests us to suggest the composition of Soft Solders.

Ordinary soft solder is an alloy of tin and lead. It is best adopted for most metals, with the exception of cast iron. Its composition varies very much, about equal parts of the metals being generally taken ; 2 parts of tin to 1 of lead furnishing what is called "weak soft solder" and 2 parts of lead to 1 of tin "strong soft solder." What is known as Darcets' Metal is an excellent soft solder consisting of lead and bismuth, each 8 parts and tin 3 parts.

Mosquito Oil.

1221 H. L. C., Lahore. Wants a recipe for mosquito oil.

An oil prepared according to the following recipe will be found effective in keeping off mosquitoes.

Olive Oil	3	parts
Oil of penny royal	2	,,
Glycerine	1	,,
Ammonia	1	,,

To be well shaken before applying to the face and hands. Contact with the eyes must be carefully avoided.

Preserving Venison.

1222 M. R. U., Chanda. Asks how to preserve venison.

The deer is cut up, freed from skin, and the best joints, back and hind legs, are placed in pickle for a few days. This pickle is made by boiling vinegar with twice its volume of water, a few slices of onion and lemon, juniper berries, laurel leaves, and rosemary, with the necessary amount of salt, the meat being introduced when the pickle is cold. It is advisable to add one third of red wine to the pickle.

After pickling, the meat is dried, well larded, and roasted with lard, the resalting gravy is prepared with plenty of sour cream, and strained like all sauces. The cold deer is cut into suitable pieces, and put into the tins along with the sauce.

Detection of Mineral Oil.

1287 H. M. D., Coimbatore. Writes, "Could you throw hints how to detect Mineral oil in Essential oils.

Petroleum, mineral oil, or fractions of the latter, are practically insoluble in alcohol, even of the highest strength, and they are, therefore, easily detected in essential oils. An essential oil which is adulterated with a mineral oil will yield a turbid mixture when shaken with 90 per cent alcohol, but this will soon become clear on standing, and the separated mineral oil will then float on the surface of the alcohol. The mineral oil when repeatedly washed with alcohol, will be recognised as such by its permanence towards a solution of potassium hydroxide, as also towards concentrated sulphuric and nitric acids.

To Distinguish between Citric and Tartaric Acids.

917 B. F. S. M., Surat. Asks, "How to distinguish between Tartaric Acid and Citric Acid ?"

The following test may be relied upon to distinguish between these two acids. About 0.2 gram of the sample is placed on a small spatula and held in a flame until it ignites. Then the spatula is removed and the ignition observed. In case of tartaric acid, the burning mass draws up into a dry cell and burns with a blue flame, the ball shrinking in size until only a small residue of carbon is left on the spatula. The citric acid, when ignited spreads out on the spatula, remaining in a liquid state while burning with a yellow flame. It burns in this manner until all is consumed, excepting a brownish-black residue spread out on the spatula. The burning is accompanied with considerable splattering.

Silica Bricks.

547 L. P., Balasore. Asks how are Silica Bricks made ?

Silica Bricks are fire-bricks used for the linings of open-hearth furnaces. They are employed for the portions where the heat is most intense, at the roofs and ports. The best bricks are made from rocks containing about 97 per cent of pure silica, about 1 per cent of alumina, and small quantities of ferric oxide and alkalies. The bricks are made with from about 1 to 2 per cent. of lime, added as a binding material, in the form of a thin paste mixed with water, added during the crushing of rock, which is done coarsely in rolls. The bricks are shaped in moulds, are then partly dried by steam, and subsequently burnt while stacked in kilns for about five days. After being allowed to cool down they are removed. They are set in a paste of silica, cement and water.

Tests of Natural and Culture Pearls.

794 S. G. K., Moulmein. Asks, "How to differentiate between Natural and Cultural Pearls ?"

A simple optical method of distinguishing the Japanese "culture" pearls from wholly natural pearls is described in the Journal of the Washington Academy of Sciences. In bead of mother-of-pearl, such as is always used for the nucleus of the "culture" pearls, the nacreous layers are not concentric to the surface, but are approximately plane, being parallel to the surface of the shell from which the bead was cut. Now normal to this surface the reflecting power, and consequently also the opacity, is at a maximum ; whilst at 90 degrees from this direction (that is, looking along the laminae) there is a minimum of reflection and of opacity. A "culture" pearl when viewed in a strong reflected light (for example, with the observer's back to the sun) shows at the opposite poles of one diameter a small bright spot due to the light reflected from the laminae of the enclosed bead of mother-of-pearl. In a strong beam of transmitted light (arranged in a closed box with·bus and mirror, the pearl resting in a circular aperture) the "culture" pearl shows two positions of maximum opacity, whilst the natural pearl is the same in all positions. A third method, which is applicable also to "culture" pearls containing a real pearl as nucleus, is given by an examination of the walls of the hole drilled through the pearl. The pearl is illuminated by a strong side light and a minute bead melted on the end of a gold wire is inserted in the bore to act as a reflector, which is viewed under the microscope. The behaviour is then substantially as in the other tests.

Miso from Soy Bean.

863. S. A. R., Saharanpur. Is curious to know how Miso is prepared from Soy Bean.

Miso, a soy bean paste made by fermentation is one of the most staple and nutritious food products of Japan. The people like it universally, and it is used as a soup stock and seasoning in every home. Indeed, miso being the chief source of protein, fats, etc., of vegetable origin, can be said to be an indispensable article of Japanese diet. The methods of making miso may be briefly described. There are two varieties—the so-called Edo, or Tokyo miso and the Sanshu, or Haccho miso. To make the former, polished steamed rice is inoculated with koji mould and kept at 70° to 80°F. for 3 days; then this koji rice is mixed with steamed soy bean, salt, and water. The mixture is then put in large wooden casks, weighted down, and allowed to ferment for from 2 to 4 weeks. The resulting product is of a light brown colour, with a sweet taste. The sanshu miso is produced chiefly in the central part of Japan. It is made by inoculating the steamed soy bean with koji mould and mixing with salt and water. This is also packed down under weights and is kept for 1 or 2 years to ferment. The result is a dark brown paste with a salty taste.

Storage of Potatoes and Onions.

1218 H. R., Cambellpur. Requests us to throw some hints on the storage of potatoes and onions.

In general, the types of construction of storage houses used for the storage of potatoes, onions and the like are very much the same. They are usually built above ground, part of the basement being beneath the surface of the ground. The precaution which is to be taken in the storage of perishable products in such buildings is to keep the products from contact with the outside walls.

'Potatoes may be started in bulk in cribs or in bushel crates or in gunny sacks. In the first case the potatoes are placed in layers about two feet deep which may be separated by some dry absorbent material, proper ventilation being provided for. In the second case they are placed in tiers about five or six crates wide, and as high as the crates can be conveniently placed in the room. In the last case, the tiers are about three to five sacks wide and sometimes ten sacks high

In the case of onions, false shelving or racks are some times provided, which are about six or eight feet wide, on which the onions are very carefully spread, eight to fifteen inches deep, there being sufficient space above the onions to admit of inspection ; but the usual practice is to replace the shelving by bushel crates, which are used for gathering such products. The crated onions are then stored in perfectly insulated buildings.

In the storage of potatoes and onions it is desirable that the products be in contact with the earth if practicable. The moisture of the earth seems to have a beneficial influence on the quality of the product if it is to remain in storage for a considerable period. Onion bins and crates, when placed directly on the earth, are less liable to jars and disturbances, which cause loss in the stored bulbs, than when made a part of the superstructure.

Lubricating Oil for Engines.

1211 R. K, Kvankse. Wants to know suitable lubricating oils for engines.

For lubricating the moving parts of steam engines, other than cylinders and values, a good grade of engine oil should be used. This oil is preferably a straight mineral oil distillate of 400°F. flash test, 20° to 31°Be gravity, and a viscosity of 180 to 250 at 100°F. For large engines with circulating oil systems, the viscosity need not usually be over 220 at 100°F as an oil of lower viscosity can be used with a circulating system which floods the bearings than without a circulating system where the oil must be fed sparingly. The excess oil tends to cool the bearings and so maintain the viscosity of the oil.

As more or less water comes in contact with the oil it is necessary to separate out this water in the oil filtering process. A good quality of filtered oil should therefore be used, and it should be protected in every way from other contaminating oils. If an oil too high in fatty oil is used in the same cylinder, some of this oil may finally work into the circulating oil supply and cause it to emulsify with the water to an objectionable extent.

For the lubrication of steam engine cylinders, heavy mineral cylinder oils should be used, mixed with from 5 to 25 per cent of rape or other fixed oil, according to circumstances. In some cases, pure mineral oil must be used, or no oil at all. Lubrication is improved by mixing a small quantity, of graphite with the cylinder oil, but unless the mixture be kept continually stirred ordinary graphite settles out and causes trouble.

Glycerine.

983 A. I. T. C., Cocanada. Enquires what process can be used for extracting glycerine from soap boiler's lye.

The lyes are first of all neutralised and evaporated as much as possible. A large part of the salt contained in the lye is separated in solid from ; this is removed and washed with neutralised lye The fluid containing the glycerine is again evaporated and compounded with such a quantity of oleic acid or of trioleins, as oil, tallow, lard, etc. The mixture contains to every molecule of glycerine somewhat more than one molecule of oleic or sebacic acid. The compound is first heated in a still to 338°F by steam and then gradually to 392°F whereby air can be excluded by introducing carbonic acid. A still provided with a strirring apparatus is used. Water escapes which may be partly present as such and is partly liberated as a decomposition product. The monolein thus formed is saponified with lime. A solution of glycerine in water is obtained from which commercial glycerine is gained by evaporation. A lime soap is also produced which after having been freed from acid may be again used.

Stearine.

978 M. M. M , Aligarh. Wants to know what stearine is.

Stearine is the harder portions of animal fat which are insoluble in cold alcohol. The softer portions are termed as olein or elain. There are three stearines or glyceryl stearates ; stearine yields an acid, called stearic acid which possesses the form of brilliant white scaly crystal and is now largely employed in soap and candle making. It may be noted here that stearine of commerce is the stearic acid.

To prepare stearine, pure strained mutton suet is melted in a glass flask along with seven or eight times its weight of ether, and the solution allowed to cool ; the soft, pasty, semi-crystalline mass is then transferred to a cloth and is strongly pressed as rapidly as possible, in order to avoid unnecessary evaporation ; the solid portion is then redissolved in ether and the solution allowed to crystallise as before,

The stearine is a white, semi-crystalline substance, insoluble in water and cold alcohol, soluble in 225 parts of cold ether and freely so in boiling ether. It melts at 137°F.

Preserving Syrups.

964 G. M., Calcutta. Wants to know how sharbet can be preserved without rectified spirit.

Rectified spirit is generally added to augment the keeping quality of the syrup. Syrups can however be preserved without the aid of rectified spirit. In this case careful methods of pasteurisation and sterilisation are to be undergone. The containers, corks, etc. are all sterilised, which consists in dipping these is hot boiling water. The syrups are then packed air-tight so as air containing germs may not get access in the bottle, rendering the syrup subject to decomposition and fermentation. Bottles of sprups thus sterilised keep long.

Peppermint Oil & Menthol.

1394 P. K. R., Rajahmundry. Writes how Pepperment Oil and Menthol are prepared.

Peppermint Oil is obtained by distillation from fresh flowering peppermint (Mentha pipereta.)

The oil is usually colourless, pale yellow, or greenish yellow, with a peppermint odour and a pungent, aromatic taste which is followed by a sensation of cold on the tongue. It should be freely soluble in 70 per cent. alcohol. The chief constituent of the oil is *menthol*. This is separated by submitting the oil to fractional distillation, or by cooling it to a very low temperature, when the menthol crystallises out in a dense mass from which adhering oil can be separated by pressure.

Peppermint oil is procured by distilling its leaves. It amounts on the average to 0·8 of the total plant used. The crystals of peppermint camphor are obtained from the distillate by cooling. the oil having been drained off, the process is repeated, when a tolerably pure oil is secured. After a third repetition no crystallisation takes place. Menthol or peppermint-camphor is a white crystalline mass.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of INDUSTRY are invited. Enquiries or replies from our experts will be published free of charge Questions are not generally replied by post.]

997 G. R. A., Damoh. Tailoring is taught at the Bengal Tailoring Institute, 14, Raja Nobokissen Street, Maharaja Cossimbazar's Polytechnic Institute, 1, Nanda Lal Bose Lane, Baghbazar, both of Calcutta. Khalil Ahmed, 18, Shyamacharan De Street, Calcutta deal in second-hand books. For urgent post reply four annas stamps are required.

998 N. N., Secunderabad Optical goods may be supplied by Stevens & Co., Inc Providence, Rhode Island; General Optical Co., Inc. Mt. Vernon, New York, both of U. S A and London Optical Co., 344 to 354, Gray's Inn Road, London, W. C. 1.

999 R K. C, Bellary. Carpenter's tools and engraver's tools may be supplied by Messrs N. G Mitra & Co, 135, Chandney Chuck, Calcutta. For Kelly's Directory of World enquire of Indian Industries & Power, 18, Ballard Estate, Bombay. Wants to buy carrara and makarana stones and ivory.

1001 G. G. R., Masulipatam. Dyes may be bought of Messrs Amin Chand Mehra & Sons, 34, Armenian St. and Hansraj Vishram & Co., 13, David Joseph Lane, both of Calcutta Chemicals used in dyeing may be had of Calcutta Chemical Works Ltd., 5, Bonfield's Lane, Calcutta.

1002 K. S., Kandy. Process of distilling water will appear in an early issue.

1003 P. S, Nellore City. You may consult Maharastra a Hindi daily published from Nagpur, C. P, and Mohini a monthly in Hindi published by Mr. Mohan Sharma, Abhana, Dt Damoh. Enquiries regarding trade and industries are published free of charge in Trade Enquiry columns of Industry. In choosing the independent profession use your own discretion. Process of making the colour of dyed fabrics fast appeared in August 1921 issue. Wants to buy book on naturopathy and chromopathy. Other queries are outside the scope of Industry.

1005 P. S R, Ellore. There is no school in India known to us where colour printing is taught. For learning photography try to be an assistant of a photographer and artist.

1006 F. C, Quilon. Your enquiry was put in June issue of Industry.

1007 A. K. G, Morena. For safety razor enquire of G. Goodman & Co., 238, Narain Pillay Street, Bangalore and Singh Sarcar & Co, 125, Harrison Road, Calcutta. For envelope enquire of W. A. Thurman, 6, Mangoe Lane, Calcutta. For scents enquire of B. K. Paul & Co 1-3, Bonfield's Lane, Calcutta.

1008 S. D. S. C. C., Hyderabad. An article on artificial silk appeared in the last June issue of Industry.

1009 K. M. T., Godhra. The import on foreign matches is Re. 1-8 per gross of boxes. Swedish Match Company is going to start factories at Bombay, Madras and Calcutta for the present.

1010 K. M. K., Dhamongaon. Formula of mercerising cotton appeared in the last June issue.

1011 A. T. C., Bezwada. For incandescent lamps enquire of Bombay Incandescent Light Co, 272, Nagdevi Street, Bombay; Fani Bhusan Kundu, 85, Harrison Road and Satish Chandra Daw & Co, 142-1, Old China Bazar Street, both of Calcutta.

1013 P. N, Chokkadi. Please refer your query to Dr. J. C. Ghosh, 30-2-4, Doctor Lane, Entally, Calcutta.

1014 P. B, L. M., Cawnpore. For catechu, cardamom and myrobalans enquire of Bansidhur Dutt & Co., 126, Khengaraputty and Haldar Dutt & Co., 90-91, Monohar Das Street ; both of Calcutta. For fancy goods enquire of Alex. Brault, 7-1, Wellesley Place, Calcutta and Singh Sarkar & Co , 125, Harrison Road, Calcutta.

1015 J. A. D., Bangalore. Try gum solution to obtain gloss.

1016 S. V. S. R., Cochin. Formula of toilet soap appeared in June 1921 issue,

1018 Q. A. R., Gujrat. Mattings may be had of Messrs. Nibaran Chandra Ghosh & Bros., 22, Old China Bazar Street and W. H. Harton & Co., 9, Canning Street ; both of Calcutta.

1019 C. Bros., Surat. You may consult Ceylon Morning Leader, Chatham Street, Colombo and Ceylon Observer, Ballie Street, Colombo.

1020 S. D. S., Bombay. For fine printing of musical signs you may write to Messrs Thacker Spink & Co., 6, Mangoe Lane, Calcutta.

1021 R. G. S., Kumbakonam. For flour grinding machine enquire of Messrs Ghatak & Co., Rai Bahadur Rd. Behala and Burn & Co., 7 Hastings St., both of Calcutta. Gypsum is calsium sulphate occuring naturally. Gypsum may be had of Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta. Spermacetti is used in the manufacture of candles and certain medicines. Curd soap is a kind of soap made with tallow and soda.

1022 K. P. & Sons., Bezwada. Can supply coconut oil in very large quantity.

1023 H. B. S. M., Jamshedpur. The initial capital to be invested in any industry depends upon its scope. You may start a small sugar factory with Rs. 5000 as initial capital. As regard experience it will be advisable for you to engage an expert at the start from whom you will be able to learn the process of manufacturing easily. There is no other means suitable for you as there is no arrangement for learning sugar manufacture in India. You may consult Mr. M. Ashanulla, 3, College Street, Calcutta who claims to be an expert in the line We shall try to act up to your suggestion.

1024 L. N. C. & Sons., Madras. Chemicals may be had of Messrs B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta. Almost all the periodicals you have mentioned are published in English. Ubersee Post (weekly) is published in English once a month. Thank you for your good suggestion.

1026 K. C. Mianwali. Saltpetre is obtained by lixiviating earth that has been formed into nitre beds.

1027 M. N. D. K., Gujranwala. You may try Messrs Williamson & Co., Oldham Road, Gaya and Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta to dispose of your minerals.

1028 B. D. M. & Co., Dibrugarh. You may consult Kelly's World Directory to be had of Indian Industries and Power, Ballard Estate, Bombay. Want to buy Burma tea seed.

1029 K. C. B. R., Gujranwala. Metal pressing machines may be supplied by Taylor & Challen, Birmingham. Isinglass, bismuth nitrate and calcium carbonate may be had of Messrs B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta. Formula of washing soda appears elsewhere in this issue.

1030 K. N. B. & Co , Rewari. Sheet metals may be supplied by Brass Goods Manufacturing Co., Brooklyn,

Kaminia - -

Oil. Used by all nations for preserving and beautifying the hair & keeping the head cool & brain refreshed. Rs. 1-4 per bottle.

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TRY IT ONCE.

Sold Everywhere.

New York and John Tragesen Steam Copper Works, New York. German dyes are imported by Messrs Aminchand Mehra & Sons, 34, Armenian Street and Mohamed Alibhoy & Co., 44, Armenian Street ; both of Calcutta. For particular please write direct to the advertiser.

1031 N. K. J., Almora. Write to the secretary Leipzig Fair, Leipzig, Germany for particulars of the fair. Formula of curing tobacco appeared in the last issue.

1032 I. C., Gujranwala. You can prepare decoction of the leaves which kill white ants or extract its principle otherwise. You can have the clay analysed by a chemist to appraise its value. As to the importance of the chil timber try furniture makers.

1033 M. S. B., Akola. Melting of aluminium can be effected at high temperatures.

1034 A. G. S, Madras. For label printing you may try The Imperial Litho and Tin Printing Works, 1-2, Machua Bazar Street, Calcutta. For scents enquire of B D. Gore, Sayana Bld., Loharchal, Bombay. Soap colours may be had of Messrs Aminchand Mehra & Sons., 34, Armenian Street, Calcutta. Chemicals may be bought of Calcutta Chemical Co Ltd., 5, Bonfield's Lane, Calcutta. As it will not be convenient for you to import those articles so only Indian addresses have been given.

1035 R. R., Revivakulam. The required address is not known to us.

1036 M. R. M., Multan City. Cotton seed oil may be had of Indian Cotton Oil Co, Ltd., Navsari, Hummum Street, Fort Bombay.

1037 C. L W., Tenali. Tablet making machines may be had of Calcutta Industries Ltd., 72, Canning Street, Calcutta.

1039 A. D. & Co., Bombay. For the required machinery please write to Oriental Machinery Supply Agency Ltd. 20-1, Lal Bazar Street, Calcutta.

1040 P. C. G, Patna. Obviously the process is very simple ; you are to mix the ingredients in given proportion.

1042 M. H. N., Lucknow. For Urdu types enquire of The Madras Type Foundry, 130, Broadway, Madras and Gujrati Type Foundry, Gaiwadi, Girgaon, Bombay.

1043 S. B., Amritsar. Laces may be supplied by Standard & Co., Saint Gall, Switzerland. Shawls are manufactured by A. Chenal & Cie, Rue du Faubourg St. Denis 137 and Guing and & Cie, faub. Poissoniere 6 ; both of Paris, France. Cloths are manufactured by Rose Hewitt & Co. and G. W. Thornton & Co, Ltd., both of Manchester, Great Britain. Process of preparing disinfectant appeared in June 1922 issue of INDUSTRY. Chemicals may be bought of B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta. Tallow may be had of Calcutta Tallow Mart, 19, Tiretta Bazar Street, Calcutta. Mahua oil may be had of The Chawla Rice, Flour & Oil Factory, Gujranwala, Punjab and Changna Marwari, Mohal, Manbhum. Caustic soda may be supplied by Calcutta Chemical Co. Ltd., 5, Bonfields Lane, Calcutta.

1044 M. R. J.. Jullundur. The new motor fuel invented has not yet been put in the market.

1045 P. H. P., Anand. For particulars of crushing mills write to Mr. N. C. Das Gupta of Durgapur, H. E. School, Agricultural Branch, Bharadvajhat, Chittagong.

1046 J. T. D., Karachi. For jewellery worn by Madras ladies enquire of V. Subramania Iyer, 207, Janajankhan Road, Royapettah and L. Narasimmul Chetty, China Bazar Road ; both of Madras.

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Belgaum. M S.M Ry.

1047 K. S., Lahore. The query referred to by you being of highly technical nature it will be advisable for you to consult some books on the subject. You may consult Practice of Pharmacy by Joseph P. Remington.

1049 S. S. B., Abbottabad. For Homeopathic medicine enquire of N. K. Mazumdar & Co., 34, Clive Street, Calcutta. The full address of Boericke & Tafel is New York, U. S. A. Homeopathic medicines may be supplied by the above firm.

1052 M. N., Castle Rock. An article on the subject will appear in an early issue of INDUSTRY.

1053 J. N. D., Tangail. Formula of damp-proofing glue appeared in June 1924 issue. Resin may be dissolved in spirit.

1054 A. P, Bhunavaram. Paper cutting machine may be had of Messrs Ashutosh Addya & Co., 16, Lower Chitpore Road, Calcutta.

1055 S. D V., Baroda. Wants to go to Germany or America to prosecute studies in mechanical engineering. Will some patron help him ?

1056 S. M. J., Galle. An article on candle making appeared in December 1922 issue. Process of silvering mirror was published in March 1923 issue of INDUSTRY. An article on the manufacture of glass bangles will be found in June 1923 issue. Process of enamelling sign plates appeared in March 1923 issue. For tin printing you are to engage an expert or you may try to be an apprentice in some printing concern.

1057 E. M. Y. S., Karaikudi. To send your exhibits in Leipzig Fair please communicate direct with the Secretary of the Fair, Leipzig, Germany.

1058 P. S. B., Haldwani. Castor seed is mainly exported to U. S. A., United Kingdom, France, Belgium and Italy. As regards inland trade, Cawnpore, Lyallpur and Calcutta, are the chief consuming centres. For machinery for picking cotton enquire of Macbeth Bros. & Co. Ltd., 2-3 Hare Street Calcutta. Formula of fertilizer appeared in October 1922 issue.

1059 R. M, Benares. You may use toy pistol which may be had of Messrs K. B. Nan, 233, Old China Bazar, Street Calcutta. You need not take any license for keeping toy pistols.

1060 N V. S. R, Bezwada. Crystals of alum may be had of Bengal Chemical and Pharmaceutical Works Ltd., 15, College Square, Calcutta.

1062 K. C. J., Almora. Wants to be put in touch with dealers in Benares made picture post cards.

1063 K. S. M., Nagaram. Sanskrit Sahitya Parishat Patrika, 7-2, Shambazar Bridge Road, Calcutta may serve your purpose. Other addresses are not known.

1064 M. R. B., Bhera. Formula of a food like Horlick's malted milk appeared in July 1923 issue of INDUSTRY Process of preparing sugar of milk will be found in November 1923 issue. For herbs and plants enquire of S. N De, M. Sc, P. O. Box No. 851, Calcutta.

1065 P. R. G., Kolaba. Milk powder is used in lieu of milk where it is not available. 1 quart is equal to about one seer.

1066 J. M. H. S, Rangoon. Slates are manufactured by Amblers Slate & Stone Co. Ltd, Dharwar, Monghyr.

1071 C. K. S., Bombay. Macerate in a small quantity of water 120 grams of gum arabic, and in another vessel with a similar quantity of water, 30 grams of tragacanth. When the latter is thoroughly swollen rub it up until it makes up a homogeneous magma, and to this add the gum arabic, Force the mass through a linen strainer and to the mixture add 120 c. c. of oil of thyme, and bring the volume up to 1 l by adding distilled water and thoroughly incorporating the whole. This preparation should be preserved in well-stoppered bottles. This preparation will give an excellent paste like gloy.

1072 K. R., Nagapatam. Messrs Aswini Kumar Paul, 134, Bow Bazar Street, Bengal Industries Co, 11, Gour Mohon Mukherjee Street; Swadeshi Udyog Karyalaya, 32, Shib Thakur Lane, Barabazar and Swadeshi Bhander 130, Bowbazar Street, all of Calcutta, supply *Charka*.

1073 P. R. J, Dehra Dun. For label printing of required design please enquire of The Imperial Litho and Tin Printing Works, 1-2, Machuabazar St., Calcutta.

1074 P. L, Lahore. For swadeshi goods enquire of Calcutta Swadeshi Co-operative Stores Ltd., 15, College Square; Bengal Miscellany Ltd., 99, Manicktala Main Road, and Dass & Co, 60, Sikdar Bagan Street; all of Calcutta.

1075 V. B. C., Kheri-Lakhimpore. Mercerised yarn may be supplied by F. W. Schinelen G. m. b. H., Kniestrasse; P. & W. Schnutenhaus Gasenburgstrasse 15-17 and C. Weber and Wiln, Denneperstrasse 27; all of Barmen, Germany. Mercerised yarn may be had of East and West Trading Co., 16, Bonfield's Lane, Calcutta.

1076 K. P., Kottayam. Sewing machines and spare parts may be had of M. Ali Chisptee, Railway Road, Jullunder City; and K. P. Thukrol & Co., Kachery Road, Lahore.

1077 S N., Wazirabad. You may send sample of wood to the Director of Industries of your province. You may try to manufacture matches with the splints and veneers bought from some factories, such as Bhowani Engineering & Trading Co., 122-1, Upper Circular Road; A. Latif 15, Paik Parah Road; both of Calcutta.

1078 L. S., Parlakimedi. To secure a job you may communicate with the following service securing agencies; Amin Bros. & Co., 174, Hornby Road, Bombay; Service Securing Agency, London House Lansdowne Road; Apollo Bunder, Bombay and Pioneer Service Procuring Agency, Delhi. Toys may be had of K. B. Nan, 233, Old China Bazar Street, Calcutta. Woollen goods are manufactured by K. B. Shaik Gulam Hassan & Co, near Amritsar Hotel; both of Amritsar, Punjab. Letter papers may be had of H. K. Ghosh & Co., 41, Radha Bazar Street, Calcutta. Blankets are manufactured by Bangalore Woollen Cotton Silk Mills Co. Ltd, Bangalore City. Glass bangles may be had of F. P. Nalladaroo & Co., 50-1, Canning Street, Calcutta and S. Aktar Husain Ansari, Mohalla Kotla, Firozabad, Agra. Caustic soda may be had of Calcutta Chemical Co. Ltd, 5, Bonfield's Lane, Calcutta.

1080 N. V. K., Dharwar. Wants to be put in touch with organisers of Art Exhibitions.

1081 O. H. R., Iowai. For carpenter's tools enquire of Messrs N. G. Mitra & Co., 135, Chandney Chuck, Calcutta.

1083 S. J. M., Dera Ghazi Khan. No such fan is known to us. To break some earthen vessels according to desired shape requires only practice and precision of hand.

1084 R. C. P., Benares City. Canadian Export Pioneer is a monthly published from 110, St. Martin's Lane, London W. C. 2. The addresses of other journals are not known.

1086 M. C. C., Badulla. Fruit essences may be bought of Messrs B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta. You may manufacture rubber toys.

Weigh Yourself

After using **Amrita Kundu Salsa with Gold** for only 2 weeks, you will find that your weight has much increased. It **Purifies the blood**, and increases and strengthens the growth of blood by creating blood corpuscle. It destroys the **mercurial & syphilitic poison.** Price 1 phial Re. 1. Postage 8 as. 3 phial Rs. 2-8. Postage 15 as. Catalogue free on application.

Kaviraj Dasharothy Kaviratna.

Dawn Lane, Hatkhola Post, Calcutta.

1088 M. B. G., Bombay. Peruvian bark is cinchona bark. Process of deodorising coconut oil appeared in August 1921 issue. An article on Otto de Rose oppeared in June 1923 issue.

1091 S. G., Kortar. Beeswax is a substance obtained from the honey comb after the expression of honey, used for making candles, sealing-wax, polishing furniture, etc. Generally two kinds of beeswax occur in commerce the yellow and the white or bleached—the last one generally adulterated with spermaceti.

1092 G. N. M., Lashkar Generally I. Sc. passed and science graduates are admitted into the Calcutta Medical College. For other particulars apply to the Principal, Calcutta Medical College, College Street, Calcutta.

1094 B R M, Vizianagram. Rice milling machinery may be supplied by Messrs Marshall Sons & Co. Ltd., 99, Clive Street, Calcutta.

1095 M S. D. A., Munnar. Manufacturing paper on small scale will not be profitable as little value is attached to hand made paper commercially. Collapsible tubes may be supplied by Venesta Ltd, 1, Great Tower Street, London E. C. 3. An article on making rubber balls appeared in March 1923 issue. Tin boxes may be had of Bengal Box Manufacturing Co., 79, Raja Nobokissen Street and Gajanand Rampertap & Co., Halsi Bagan Road, both of Calcutta.

1096 M. P. T., Myaungmya. The exact formula of Kitson Light mantle is not known. But it you want to make it more stiff you may replace cotton by ramie fibre or preferably by artificial silk.

1097 R. M. V., Colombo. Watch glasses may be supplied by Konishi Kotakude & Co., 1, Nakabashi-Izumicho Kyobashi-Ku, Tokyo and Jayan Watch Glass Manufacturing Co., 8, Rokuchome; Kaigandori, Kobe, both of Japan. Cycle and cycle accessories may be supplied by Miyata Works. 52, Nichome, Kikugawa-cho, Honjo-ku, Tokyo and Otani Nanyo Trading Co., 1, Chome, Moto-machi Kobe; both of Japan. Brushes are manufactured by Otsuka & Co., 30, Gofuku-cho, Nihanbashi-ku, Tokyo, Japan.

1098 B. B. P., Surat. An article on solid brilliantines appeared in June 1921 issue. Flake-white is pure white-lead. Flake-white may be had of Bengal Chemical & Pharmaceutical Works Ltd., 15, College Square, Calcutta. For other chemicals also enquire of the above firm.

1100 K. T. J., Rohri. Your enquiry is receiving our attention.

1101 R. S. M., Bharatpur. Waste cotton may be had of P. S Michael, 76, Prinsep Street, Calcutta. It is not possible to prepare soap from scum of oil.

1105 K. V. R. Hindupur. The Calcutta quotations of the dals are: gram or chana-dal Rs 5 to 6; arhar or toor dal Rs. 4-12 to Rs. 7 and wheat Rs. 5 to Rs. 6 6.

1106 S. M. A., Lakheri. You may consult Mr. J. C. Ghosh, 30-2-4, Doctor Lane, Entally, Calcutta.

1107 S. S. L, Wadhwan Camp. No such formula is known.

1109 M. A., Poona. The formula referred to makes one dose only.

1110 D. L., Myaungmya. Please go through the article on enamelling sign plates that appeared in March 1023 issue of Industry.

1111 M. G., Imphala City. Formula of hair dye appeared in the last issue. Yarns may be supplied by Javari & Co., Manchester; Br. Thread Mills Ltd., Leicester both of England and Iida & Co. Ltd, 1-3, Nishikangacho Kyobashiku, Tokyo, Japan.

1112 D. N. S., Amritsar. To communicate with any querist address him by number and initials under care of Industry when your letters will be duly redirected.

1113 S. C D., Delhi. Please send particulars of the machine invented by you; we may then try to find out a capitalist.

1115 S. D., Sholinghur. For books on watch repairing try Messrs Chakravartty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

1117 M. P. S , Agra. Tin printing is undertaken by the Calcutta Tin Printing & Hollow Wares Ltd , 133, Beliaghata Main Road, Calcutta. For label printing enquire of The Imperial Litho and Tin Printing Works, 1-2, Machua Bazar Street, Calcutta.

1118 C. A. A. S , Cumbum. Please refer your query to Messrs Brinjraj Zorawarmull Batia, 2, Raja Woodmunt Street, Calcutta.

1119 S. M. K. E. C., Meerut. For London-Prague daily cross rate consult some dailies of United Kingdom.

1120 P. P. V., Trichur. Process of manufacturing indigo appeared in July 1921 issue. Refer your other query to Mr. S. N. De, M Sc., P. O. Box 851, Calcutta.

1123 A. K., Banosa. Articles on celluloid manufacture appeared in October and November 1924 issues of INDUSTRY. Process of preparing slate pencils will be found in March 1923 issue. Palm oil may be had of B. K. Paul & Co , 1-3, Bonfield's Lane, Calcutta.

1124 S R. B., Poona City. Process of de-ordorising coconut oil appeared in December 1920 issue.

1125 R. S., Udipi. Socks may be had of Mr. N. Bose, Beliaghata P. O., Calcutta.

1126 K. R. R., Berhampore. Candles are manufactured by Salem Companies Ltd., Salem.

1127 T. D. B., Nurpur. To communicate with any querist address him by number and initials under care of INDUSTRY when your letter will be duly redirected.

1128 K. K., Kasur. You may go through New Idea columns of INDUSTRY and choose one of the ideas.

1129 B. N. S., Hole Narsipur. For paddy you may write to Jogindra Chandra Dass 54, Canning Street, Calcutta. Other addresses appear elsewhere in this issue.

1130 S. S. D , Bhabna. Process of preparing vinegar appeared in January 1924 and that of preparing alcohol appeared in August 1923 issue. Preparation of *hooka* tobacco appeared in July 1920 issue.

1131 V. I , Ramnad. Please write clearly what industry you wish to learn.

1132 V. K. R., Bezwada. You may use ordinary chalk in preparing tooth powder. The firm referred to by you is perhaps a bogus one.

1135 N. R. M., Raniganj. Formula of damp-proofing glue appeared in April 1924 issue you may apply damp-proofing glue to your matches instead of ordinary glue

1136 S. A A., Karnah. For the required machine you may write to Messrs Ghatak & Co., Rai Bahadur Road, Behala, S. Calcutta.

1137 M. P. K. K , Palani. Aluminium plates may be had of Rauddi Appalaswamy, Rajahmundry.

1140 T. V , Masulipatam. The manufactories of glass wares are Allahabad Glass Works, Naini, E. I. Ry ; Jubbulpore Glass Factory, Jubbulpore C. P., Paisa Fund Glass Works, Talegaon. Dist Poona, Bengal Glass Works Ltd, 39-1 Canning Street, Calcutta and Calcutta Glass and Silicate Works 101 Cornwallis Street, Calcutta. Glasswares of all descriptions may be had of them. Theatrical dresses may be bought of Kunja Lal Pal, 318 Upper Chitpore Road and Atul Chandra Pathak, Victoria Theatre

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ASK FOR ANY FEVER
AGUE KILLER.
1 Phial As 8. Doz. Rs. 5.
and our other popular remedies. Can be had everywhere at Cheapest Rate.
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118 Upper Chitpur Road, both of Calcutta. Matches are manufactured by Amrit Match Factory, Kota, Bilaspur ; Prasanna Match Factory, Deore, Dacca ; Oleum Match Factory, Rajganjpur, Chaibassa ; Mysore Match and Candle Factory, Mysore ; Sunderban Match Works, 12 Dalhousie Square and National Match Factory, Canal East Road, Ultadanga, last two of Calcutta. Fancy goods are imported by Messrs Singh Sarkar & Co. 125 Harrison Road Calcutta and Alexander Brault, 7-1 Wellesly Place, Calcutta. Papers are manufactured by Titagarh Paper Mills Ltd, Chatered Bank Bldg, Clive Street and Bengal Papers Mills Ltd, 103 Clive Street, both of Calcutta Petrol lamp is imported by K C Dey & Sons, 90 Lower Chitpur Road, Calcutta. Other addresses are not known.

1142 T. R. L., Delhi. An article on ink manufacture appeared in November 1922 issue.

1143 D. P. L., Nawabganj. You may try Messrs Singh Sarkar & Co., 125 Harrison Road, Calcutta.

1144 P. B. B. L., Salem. Stearine and paraffin wax may be had of Messrs B. K. Paul & Co, 1-3 Bonfield's Lane, Calcutta.

1146 G. K. J., Karachi. For cotton spinning please consult an expert in the line.

1147 A. B. E., Haptore. Wants to be put in touch with dealers in Burmese sandal.

1148 S. V., Conjeeveram. Refer No. 1127.

1150 B. B. L., Ambala City. Watches may be supplied by Combine Watch Co. 1·0 Hatton Garden London E. C. 1., Hamilton Watch Co., Lancaster, Pennsylvania. U S A ; Kamekichi Yamazaki, 12 Shichome, Bakuro-cho, Nihonbashi ku, Tokyo, Japan and Josef Antel, Grosse Trankfurter Strasse 34, Berlin No. 13 Germany. Watch materials may be supplied by Lennox Watch Material Co, 0-41 Holborn Viaduct London E. C. 1.

1154 R. K., Mirzu Calendars are printed by American Art Works, Coshocton Ohio : Stone Printing and Manufacturing Co. Roanoke, Virginia and Henderson Lithographic Co., Cincinnati, Ohio

1156 R. S. M , Ponveri. Formula of fruit syrup, appeared in October 1922 and January 1923 issues of Industry. Rubber mats may be had of Dieu Axe Rubber Co. Ltd. 28c Bow Bazar Street, Calcutta. Formula of artificial essences (used for handkerchief perfume) appeared in October 1922 issue

1157 R. S G , Maymyo. Dry batteries may be refilled and used for lighting purposes, the process of which appeared in June 1923 issue. Waste electric bulbs become useless.

1158 S S. G , Cawnpore. To start prospective industries please go through September 1923 issue of Industry.

1159 V. R. M. S., Bellary. You should try to be an apprentice in the match factories already started throughout India For learning soap industry apply to the Principal, School of Chemical Technology, 30-2 4, Doctor Lane, Entally, Calcutta. For electrical engineering you may enquire of Bengal Technical Institute, Jadabpur, 24, Parganas and Bengal Engineering College, Shibpur, Howrah.

1160 I S., Choor Khana. For swimming belt enquire of Mohantosh Bros, 15, College Square and S. Ray & Co., Chowringhee ; both of Calcutta.

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Silver Medals, Cups & Shields.
Fine Silver Medals in Velvet lined cases.
Rs 3-12 Each.
Largest Stock & Variety.
Illustrated Lists Free
CARR & MAHALANOBIS,
CHOWRINGHEE CORNER CALCUTTA.

1161 M. A. H., Jullundur Cantt. Formula of catechu appeared in June, 1922 issue.

1162 O. A. R., Lahore. Mattings are manufactured by Messrs Hassan Ali Chowdhury & Co., 2-4, Chandney Chowk, Calcutta.

1163 T. B. S., Anakapalli. You may go through September 1923 issue of Industry which dealt with the prospective industries of India.

1164 U. I. N. T. C., Moradabad. For blocks of different designs write to Messrs. U Roy & Sons, Garparh Road, Calcutta.

1166 B. K., Ambala. Gramophones may be had of James Manufacturing Co, 163, Kalbadevi Road Bombay.

1167 L. B. D., Rajgiriya. Yarn may be had of East and West Trading Co, 16, Bonfield's Lane, Calcutta.

1168 T. R. M., Sialkot City. Penholders are manufactured by F. N. Gupta & Co, 12, Beliaghata Road, Calcutta; Eastern Small Industries Ltd, Dacca and Chakravarty & Co., Ranidighirpar, Comilla.

1169 K. R. R., Ellore. For particulars of training sanitary inspectorship apply to Sanitary Commissioner, Writers Bldg, Calcutta.

1170 C. N. C., Goa. Process of preparing floor tiles will appear in an early issue.

1171 A. L. S. Dacca. Maranta arundinacea may be bought of Mr. S. N. De, Post Box 8,1 Calcutta. Refer to No. 1127.

1172 D. A. M., Canjeeveram. Please refer to No. 1171.

1173 N. D. D., Ghaziabad. Cardboard boxes are manufactured by Messrs L. B. Verma & Bros, Cawnpore.

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29-1, Telepara, Sampooker st. Calcutta

1174 W. M. H., Meerut City. To sell your books advertise in some widely circulated paper such as Industry.

1175 M. B. T., Thonze. Dip a lamp wick in honey and ignite it, if the flame does not flicker and burns uniformly the honey is genuine otherwise it is artificial. Magnesia, the oxide of magnesium, slowly combines with water to form a hydrate; the same compound is produced on adding potassium hydrate to a solution of a magnesium salt.

1176 N. N. L., Raichur. We are not sure if the party is in existence. Write to it for some particulars and if no reply is received there may be some grounds of doubt about its stability. Please state the full address of the party so that we may make necessary enquiries.

1177 N. K. D., Rangoon. *Papri khaer* is prepared from a concentrated decoction of Acacia Catechu wood by placing in it a few twigs and allowing the decoction to cool. The twigs are removed and the crystalline substance found adhering to them is collected and pressed into large irregular cubes.

1178 D. G. D., Karjat Nagor. For the making of cigars you are referred to an article on the subject in the September 1920 issue of Industry.

1179 C. I. & E. Co., Gujrat. Metal sheets are supplied by Balmer Lawrie & Co., Ltd, 103, Clive Street, Calcutta; William Jacks & Co, 5, Murzban Road, Bombay.

1181 P. S., Rawalpindi. Urdu equivalents of all chemicals are not known.

1182 N. Y. K., Malvan, You may go through Palmistry Self-Taught by Prof R. P. De to be had of Messrs De, Bros B. 47 S. 5 Hogg Market, Calcutta. The best way of learning the art of jewellery would be to work as an apprentice in a big jewellery firm. You may learn homeopathy by correspondence from Edward Medical College 104A, Cornwallis Street, Calcutta. There is no private College in Calcutta conferring M.A., Ph.D., etc, degrees.

1183 N. G. S., Bombay. A formula for renovating gold ornaments will appear in an early issue.

1184 G. R. M., Tirbediganj. Small orders of standard articles are not carried on consignment system. Write to the manufacturers giving your references and stating your business status.

1185 B. B., Baldeo. For a list of watch manufacturers of Switzerland consult the November, 1923 issue of Commercial India.

1186 M. M. I., Madras. Method of deodorisation of coconut oil appeared in April 1922 issue of Industry. Your attention is drawn to the notice at the top of Query column.

1187 M. P. G., Jaipur. Colours may be purchased of Messrs Amin Chand Mehra, 34, Armenian Street, Calcutta. essences and perfumes are supplied by P. Mukherjee & Co., 28-29, College Street Market, Calcutta.

1188 J. M. S., Ambala. For spinning machines you are referred to Sorabjee Shapurjee & Co., 30-3, Hornby Road, Bombay and W. H. Brady & Co. Ltd., Royal Insurance Bldg., Churchgate, Bombay.

1190 J. M. T., Bhagavangala. Wants to purchase Chinese almonds. Can supply oyster, rat skin, firewood.

1191 G. R. V. N., Coimbatore. Potato flour means starch manufactured from potato. Consult an Anglo-Tamil Dictionary for tamil equivalents.

1192 A. K. G., Morena. Water colours for painting are supplied by Messrs K. B. Nan & Co., 233, Old China Bazar Street, Calcutta.

1194 M. T. H., Madras. The following are the addresses of printers: (1) Garhwali Press, Pt. Bhiswambhur Dutt Chandola, Dehra Dun; (2) Goorka Press Co. Ltd., Dehra Dun; (3) Hindi Literature Publishing Association, Dehra Dun; (4) Mussorie Times, Mussorie; and (5) Pioneer Mussorie Bulletin, Mussorie.

1195 N. K. R., Bezwada. Wants to know the address of the Sole Agent for India for Diploma Condensed milk. Would any of our subscribers help him?

1196 M. Y. B., Rath. Recipes of black hair dye appeared in the last issue of Industry. You may add rectified spirit 60 overproof to preserve the juice.

1197 S. R., Mohoda. Write for particulars to the Pathe Cinema Ltd., Pathe Buildings, Bombay for films on hire purchase system or otherwise.

1202 C. B. D., Nadiad. If you use potato starch in the washing soap manufactured by you it will be too costly. To make soap rather soft use caustic soda in less quantity. A formula of good washing soap appeared in August 1921 issue of Industry.

1204 K. G. S. C., Ellore. Your query is outside the scope of Industry.

1205 S. A., Bangalore. For a catalogue of industrial books write to Messrs Chakravarty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

1206 C. H., Aijal. Wants to be introduced to dealers in tobacco leaves of Patna.

1207 P. S. M., Bezwada. Blocks may be had of Messrs U. Roy & Sons, Garparh Road, Bharatvarsa Halftone Works, 201-1, Cornwallis Street and Mahila Press, 29, Pataldanga Lane; all of Calcutta. Tablet making machines may be purchased of Calcutta Industries Ltd., 72, Canning Street and Oriental Machinery Supplying Agency Ltd., 20-1, Lal Bazar Street; both of Calcutta.

1208 H. R. B., Lakhimpur North. Arms and ammunitions may be had of Messrs Eric Hill & Co., Chapel Road, Hastings; D. N. Biswas & Co., 5, Dalhousie Square East and K. C. Biswas & Co., 1, Chowringhee Road; all of Calcutta.

For Your Requirements
for machinery and tools for any industry.
Please write to—
KALKAR & CO., Industrial Engineers.
Dadar, Bombay.

1209 M. B. H., Mangalgarh. Can supply bones.

1210 H. D., Shillong. Size of the blowing fan depends upon the size of the furnace used by you. For the required equipment enquire of some iron foundry that may prepare the pulleys, etc. as per order. It is not possible to transmute copper into steel.

1213 B. D. C. L, Quetta. Amla oil may be supplied by Messrs Gobind Ram Kahanchand, 31, Lower Chitpur Road, Calcutta. Soap colours may be had of Messrs Aminchand Mehra & Sons, 34, Armenian Street, Calcutta. Formula of powder hair dye appeared in September 1922 issue.

1216 A. B. C., Simla. You may try to secure new blades for the old ones from the firm from whom you have purchased it.

1216 (a) A. M. I. K., Bassein. Formula of artificial gold appeared in July 1923 issue. Artificial gold resembles real gold in colour only.

1217 D. K. M., Ahmedabad. Jewellery cases may be bought of Messrs Alibhai Vallijee, Multan Cantt. Punjab. Imitation jewellery may be had of H. Bakardas & Co., Alipada Street, Bombay. Imitation pearl may be had of of Benode Behary Dutt, Lal Bazar, Calcutta.

1223 B. B., Calcutta. Wants to purchase regularly soap manufacturing chemicals, oils and tallows.

1224 K. C. A., Amritsar. A Government servant cannot conduct any private business without the permission of higher authority.

1226 E. K., Sitarampur. Tobacco and leaves for preparing *biris* may be had of Messrs Moolji Sicka & Co., 51, Ezra Street, Calcutta.

SETT DEY & CO

ORIGINAL HOMŒO PHARMACISTS
42, Strand Road, Calcutta.
Dealers in Boericke and Tafels.
Original MACHINE MADE Dilutions
CATALOGUE FREE ON APPLICATION.

1228 M. M. & Co., Ranchi. To communicate with any querist address him by number and initials under care of INDUSTRY when your letters will be duly redirected.

1230 K. S. S., Bombay. Stamping ink may be had of Bengal Miscellany Ltd., 99, Manicktala Main Road, Calcutta.

1231 Z. & Co., Agra. Refer to No. 1228.

1234 A. H. K., Aurangabad. Boots and shoes may be had of Badam Bros., 29-1, Bentinck Street; Beadon Shoe Stores, 347, Upper Chitpore Road, and North-West Tannery Co., 25, Chowringhee Road; all of Calcutta.

1236 K. V., Bellary. Tin boxes may be had of Bengal Tin Box Manufacturing Co, 79, Raja Nobo Kissen Street and Gajanand Rampertap & Co., 6, Halsi Bagan Road; both of Calcutta.

1238 P. V. S, Dharwar. Process of recovering gold and silver from gold and silver plating solutions respectively will appear in an early issue.

1240 D. B. M. & Sons, Bombay. It will be better for you to send circulars to all the druggists and chemists of Calcutta from a directory. For corcking machines enquire of Oriental Machinery Supply Agency Ltd., 20-1, Lal Bazar Street, Calcutta. Tablet making machines may be had of Calcutta Industries Ltd., 72, Canning Street, Calcutta. Tin printing is done by The Calcutta Tin Printing & Hollow Wares Ltd., 133, Beliaghata Main Road, Calcutta and P. Lodge & Co., P. O. Box 6772, Calcutta. For advice regarding advertisement write to Alliance Advertising Agency, Waterloo Street, Calcutta.

1242 T. Z., Aijal. Wants to be put in touch with the sole agent of Virgo Hurricane-Lanterns in Calcutta.

1243 L. D, Calcutta. Wants to be introduced to metal polish manufacturers.

1251 Roll 14429. Oil of mirbane is used in cobra boot polish as perfume. Perfumes may be supplied by H. & C. Davis Co. Ltd., The Pavement Clapham

Common, London S. W. 4 and Erasmic Co. Ltd., London.

1253 K. G., Tikamgarh. Rubber goods are manufactured by The Dieu Axe Rubber Co. Ltd., 289, Bow Bazar Street, Calcutta.

1254 S. D., Madura. Swadeshi cloths may be bought of Calcutta Swadeshi Co-operative Stores Co. Ltd., 15, College Square, Calcutta. Directory of swadeshi goods may be had of the Indian Industrial Conference, Amraoti. Wants to be put in touch with firms dealing in Tinnevelly shoes.

1255 V. G, Lucknow. Pitch may be had of The Lister Antiseptic Dressing Co., 12, Dalhousie Square and The Shalimar Tar Distillery and Waterproof Manufacturing Co. Ltd, Mg. Agts. Messrs Turner Morrison & Co. Ltd, 6, Lyons Range, Calcutta.

1256 D. P. S., Nawabganj. Wants to know the name and address of the agent of red lamp and umbrella cigarettes. Safety matches are manufactured by Oleum Match Factory, Rajgangpur, Chaibassa ; Prasanna Match Factory, Deori, Dacca and Safety Match Manufacturing Co., Olavakot, S. Malabar.

1257 M. D., Jamadoba. Saw dust may be used in manufacturing pasteboard. To popularise the beautifier manufactured by you advertise widely and engage some canvassers. To dispose of your used postage stamps advertise in some widely circulated paper, German medicines may be had of Messrs B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta. For commercial information of Germany write to Consul-General for Germany, 2, Store Road, Ballygunge, Calcutta.

1258 S. & Co., Allahabad. You may use commercial pearl ash which is cheaper than chemically pure pearl ash.

1259 C. I. E. C., Gujrat. Wants to be put in touch with exporters of guts.

1260 K. B., Bijapur. Calico-printing blocks may be supplied by Mr. Jogesh Chandra Pathak, Asstt. Teacher Cargill H. E. School, Sandwip and Mr. Padmasbah Chakravarty ; both of Noakhali. Colours may be had of Calcutta Chemical Co. Ltd., 5, Bonfield's Lane, Calcutta.

1265 S. C. B., Chaungu. Seek legal advice.

1265 K. S. R. C., Kumbakonam. For diamond cutting enquire of Messrs Ginder & Ginder, 24, Hatton Garden London E C 1. H. Baronav Cogels 43 and Kryn Jacq, rue Coquilhat 49 ; last two of Antwerp, Belgium. The other query being in the nature of an advertisement should not be dealt with in these pages.

1265 K. S. B. C., Sulhalia. In every vew industry pioneers have to meet some amount of difficulties and success can only be acheived from experience through failure. No match factory offers dipped splints. Ordinary splints may be had of Bhowani Engineering & Trading Co., 122-1, Upper Circular Road and C. A. Mohamed, 15, Synagogue Street ; both of Calcutta.

1267 M. M. P., Bonia. For books on well boring enquire of the Book Co. Ltd, 4-4A, College Square, Calcutta. Process of curing tobacco appeared in June 1924 issue. An article on cigar and cigarette manufacture appeared in September 1920 issue. Cigarette making machines may be supplied by United Cigarette Machine Co., 59, Holborn Viaduct, London.

1268 R. K. C., Bellary. Marble stones may be had of Sitaram Laxman & Son, Bank Street, Bombay and Ewing & Co. Ltd., 2, Royal Exchange Place, Calcutta.

1269 P. S. J., Agra. Crystals of silver nitrate and ammonia solution

General Order Supplying Nursery

The best house for placing orders.
If you are in need of anything,
please to book your order with
DATTA, BOSE & CO.,
23, Ram Rattan Bose Lane, Calcutta.

should be used. Gall nuts may be bought of Bansidhur Dutt & Son, 126, Khangraputty, Barabazar, Calcutta.

1270 P. A. S., Alleppey. There is no arrangement for learning imitation leather industry and cement industry in India. An article on imitation leather will appear in an early issue of INDUSTRY.

1271 C. A. L., Pilibbit. Lathes may be had of Messrs Alfred Herbert (India) Ltd., 13, British Indian Street, Calcutta. For the industrial and mechanical books you require please write to Messrs Chakravarty Chatterjee & Co. Ltd, 15, College Square, Book Co. Ltd., 4-4A, College Square and Thacker Spink & Co., 3, Esplanade East; all of Calcutta. The Textile Mercury, Carr Street, Manchester, England is a weekly dealing with interesting items of spinning. bleaching and dyeing. A very high polish may be given to cut glass dishes, decanters, etc. by sprinkling with warm saw dust directly after washing and drying the usual way. A very soft chamois leather must give the final polish, and this should be kept free from dust and for the one purpose only. Books, on ethnology may be had of Messrs Butterworth & Co., 8, Hastings Street, Calcutta.

1274 M. K. L., Dhariwal. For starting small prospective industries please go through September 1923 issue of INDUSTRY.

1275 H. L. L, Maldah. Both the formulas are equally good but the product will be different. Hence try with the one which seems to be after your liking. For gold and silver leaves enquire of Messrs M. Seth & Co., 71-1, Sukeas Street, Calcutta. The scent you require may be had of Messrs P. Mukerjee, 29-30, College Street Market, Calcutta.

1277 K. G. P., Saugor. Refer to No. 1127.

1278 A. H. M., Ahmedabad. For melting rubber you will have to buy a vulcanising apparatus.

1279 S. B., Kullur. Indian Agricultural Journal may be had of Messrs Thacker Spink & Co, 3, Esplanade East, Calcutta. Refer your query regarding used postage stamp to The Philatelic Society of India, 15, Burrows Street, Bombay. Bombay 2, 3, 4 etc. refer to postal divisions of Bombay. Take a little quantity of garlic juice and a little musk. Dissolve the musk in the juice; if the flavour of the musk completely suppresses the bad smell of the garlic the musk is genuine, otherwise not.

1280 T. V, Masulipatam. Your queries have already been replied to

1283 G. P. S., Rawalpindi. Ten lbs. fresh grapes are put into a large jar or crock, 3 qt. boiling water poured over them, and when the water is cool enough to permit of it, squeeze the grapes well with the hand. After allowing the jar to remain 3 or 4 days covered with a cloth, press out the grapes, then add 5 lbs. of sugar, Allow it to remain for 1 week skim and strain carefully, then bottle, corking loosely. After the fermentation is completed strain and seal tightly. For the required machinery please write to the Oriental Machinery Supply Agency Ltd., 20-1, Lal Bazar Street, Calcutta.

1284 S. V. G., Vizagapatam. Formula of sealing wax appeared in November 1921 and an article on castor oil preparation will be found in January 1924 issue. Essence may be bought of Messrs Sikri & Co., 55-8, Canning St., Calcutta.

QUITE FREE.

Samples & Price list of the most popular

Monkey Brand Black TOOTH POWDER

for all Dental Diseases.

Apply to—

NOGI & CO., Bombay No. 4.

1285 S. P. M., Ahmednagar. Tallow may be bought of Calcutta Tallow Mart, 19, Tirettra Bazar Street, Calcutta.

1286 P. A. S , Masulipatam. Take advice of any big jeweller who cuts precious stones.

1287 C. M., Tuticorin. Tin sheets may be had of Kanai Lal Dhur, 11, Swallow Lane, Calcutta. Twine may be supplied by M. Set & Co., 71-1, Sukeas Street, Calcutta. Brown papers may be bought of Ghose Brothers, 63J, Radha Bazar Street, Calcutta. For essence enquire of B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta. Glass bottles may be had of Satya Charan Paul, 194, Old China Bazar Street, Calcutta and C. K. Das & Sons 17, College Street, Calcutta. Glucose may be supplied by Bengal Chemical & Pharmaceutical Works Ltd , 15, College Square, Calcutta.

1288 L. S., Parlakimedy. Please refer to 1018.

1290 M. A. H., Barh. For arms and ammunitions write to Esoofally Mohamedally & Co., 78, Bhusari Mohalla, Crawford Market and Mohamedally Noorbhoy, Abdul Rehman Street, near Crawford Market ; both of Bombay.

1293 H. G. C., Wazirabad. Following are some of the commercial firms of Zanzibar ; (1) Ali Nathu ; (2) Childs and Joseph ; (3) K. Choitram & Co ; (4) Cowasjee Dinshaw & Bros ; (5) M. R. Nathani and (6) R. N. Telati & Co.

1294 M. B. P., Zigan. The books you require may be had of Kamala Book Depot Ltd., 15, College Square and The Book Co. Ltd., 4-4 A, College Sq., both of Calcutta. The Journal of Indian Industries and Labour has ceased publication.

Deafness.

All EAR troubles, Drum weakness & Rattling is fully cured by KARAMAT OIL.

Price per phial Rs. 1-4. with dropper Rs. 1-8. Correspondence should be in English

BALLABH & SONS., Pilibhit, U. P. India.

1295 C. P. W., Bhiria. Your query being in the nature of an advertisement should not be dealt with in these pages.

1296 G. B., Aroni. Formula of rolled gold appeared in the June 1924 issue.

1297 A. R., Gudikota. No easy process is known of transmuting baser metal into gold.

1298 K. C., Dacca. For ideas for self-supporting students please go through the New Idea columns of INDUSTRY.

1299 V. S. S., Vizianagram. Envelope making machines may be had of Oriental Machinery Supply Agency Ltd, 20-1, Lal Bazar Street, Calcutta. Rubber stamp making apparatus may be bought of Messrs S. C. Dutt & B. K. Dutt, 100, Durga Charan Mitter Street, Calcutta.

1300 A. R., Dacca. You may correspond with Mr. Jogindra Chandra Das, 54, Canning Street for purchasing country produce. German dyes are imported by Messrs Aminchand Mehra & Sons., 34, Armenian Street, Calcutta. All the chemicals you require are manufactured by The Calcutta Chemical Co. Ltd., 35-1, Panditia Road, Ballygunge, Calcutta ; D. Waldie & Co. Ltd, Konnagar, Howrah ; Bhavnagar Chemical Works, Varteg, Kathiawar ; Punjab Chemical Works, Shahdara, Lahore ; Bengal Chemical and Pharmaceutical Works, 15, College Square, Calcutta ; Bengal Acid Manufacturing Co., 30, Bagmari Road, Calcutta ; B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta and Sree Radha Krishna Acid Factory, P. O. Naulakha, Lahore. It is very difficult on our part to say which of the English firms are willing to establish business connection with India, so please apply to them with your business reference.

1301 K. B. T. C , Srinagar. For cinema films enquire of Verman Film Producers 137, Esplanade Road and Pathe Cinema Ltd, Pathe Bldg. Ballard Estate ; both of Bombay.

Notices and Reviews.

"Bhugol".

This is a well got up geographical magazine in Hindi edited by Mr. Ramnarayan Misra, B.A., Meerut.

Hair Dye.

Messrs N. L Verman & Co., Ludhiana, are the manufacturers of Verman Black Hair Dye.

Ayurvedic Medicines.

We have received samples of Sadagunabali-jarita Makaradhwaja and Sarna-sindur from Karail Laboratory, Mahera, Mymensingh, E. Bengal.

Nut Cracker.

Nice nut-crackers of brass are made by Messrs Chunilall & Sons, Lindi Bazar, Jamnagar-Kathiawar. These have sharp steel blades and are strong and well finished.

Boot Polish and Cream.

We have much pleasure in recommending our readers to use "Hydra" Boot Polish and Cream, the products of the Oriental Industrial Co., Bonfield's Lane, Calcutta. These are non-sticky, leather-preserving and on application ensure good polish. To encourage Swadeshi industries the public should give preference to country-made articles over foreign goods.

Books in the Vernacular.

We thankfully acknowledge receipt of a Marathi Pamphlet on Home Industries for Ladies from the Institute of Individual Industries, 170 Shukrawarpeth, Poona City.

Also a Gujrati Book entitled "Suner Sar Samuday" containing numerous formulas from the compiler Mr. S. J. Gandevia, Rustompera, Surat.

These who are interested in these books may write to the respective addresses

Nibs.

It gladdens our heart to note that Messrs C. M. Karmaker & Co., Kanderpar, Comilla are manufacturing smooth nibs with machines of their own design. We wish the enterprise every success.

Bengal Textile.

All kinds of home made textiles of Bengal are stocked by Dacca Trading Corporation, 27, Cornwallis Street, Calcutta. Besides khaddar there are fine dhoties beautiful series, close woven chaddars, shirtings and coatings, towels and dusters, blouse pieces, etc. etc.

In addition there are horn and pearl buttons, conch-shell articles, etc. The products are good and, the prices moderate.

Inks, Paste, etc.

Among the articles manufactured by Lunar Chemical Works, 9, Shibpur Bye Lane, Howrah are writing inks, black and red; fountain pen ink; rubber stamp ink, ink powder, tablet and essence; mucilage and paste, etc. Their quotations are favourable.

Technical Literature in Vernacular.

The Calcutta Industrial Club, Samavaya and Mansion, Calcutta, desire to issue a series of pamphlets and books in vernacular dealing with technical and vocational subjects in a popular manner. Useful suggestions on this project are invited from the readers of Industry. The association's idea at present is to offer a prize of Rs. 1000 for the best book in an Indian vernacular on the first subject which has been selected, namely, "Carpentry."

Wanted Immediately.

Agents on commission, Managers, Accountants, Typists, Clerks, and Salesmen throughout India Only practical businessmen and qualified persons need apply enclosing red stamp to :—

The Managing Agents,
THE INDIAN ARTS & INDUSTRIES LTD.,
Simla

Candles.

The "Kesari,' candles of [illegible] Company Ltd , Salem, S. [illegible] satisfactory quality. The [illegible] encouragement at [illegible] public.

Kosmos.

Edited [illegible] 5, Chow[illegible] [illegible]nual subs[illegible] subject ma[illegible] [illegible]es a wide [illegible] thoughtful [illegible]nts ; instructive [illegible] topics ; handy [illegible] tid bits ; and the [illegible]ustifying its subtitle [illegible] magazine of universal

Trade Enquiries.

[illegible]etters to the parties are to be addressed by [illegible]ber and initials under care of INDUSTRY [illegible]hen these will be duly redirected]

1048 U. C. P., Badarpurghat. Wants to be put in touch with dealers in bamboo, cane for making basket, straw, plantain fibre, paddy, dry ginger, myrobalans and turmeric.

1099 D. C. M , Lalamusta. Wishes to buy milk of euphorbia shrub.

1114 V. R. R., Triplicane. Wants a capitalist to invest in some mining concern.

1122 B. R. H., Raxaul. Desires to be put in touch with dealers in Tibetan wool in Bombay and Calcutta.

1133 J. C. L., Jagraon. Desires to be introduced to dealers in jute yarns and jute cloths.

1151 J. D. D., Bannu. Wants to be put in touch with suppliers of Rangoon ivory pieces.

1152 A. C. S., Dacca. Exports Indian medicinal herbs such as oshba lajanti.

1155 M. D. G., Jamadoba. Wants a capitalist to invest in a mining concern.

[illegible] G. B., B. L., Lahore. Is [illegible]ceive circulars, prospectus, [illegible]s, etc. to be placed on [illegible]ole of a Library free of charge.

[illegible]235 M. K. S. A., Indore. Wants [illegible]n expert in glass industry.

1263 S. D , Belgaum. Wants to be put in touch with manufacturers of zinc buttons and school rules.

1273 C. C. M , Gaya. Desires to be introduced to mineral dealers of India.

1282 C. C., Jalaun. Wishes to go to U. S. A. to learn sugar industry. Will some patron help him ?

1341 H. B., Aligarh. An energetic young man wants agency of some firm.

1355 C. C. C., Ambur. Can supply palmyra jaggery.

August Issue of Industry.

(*In the Press.*)

The August issue of INDUSTRY will contain articles on Morabba Making, Picture Frame Moulding, Tapioca Manufacture, etc. in addition to the usual features such as New Ideas, Small Trades, Formulas, Processes, etc. Any friend of our subscribers may get a copy free as sample on application to the—

Manager, INDUSTRY, Calcutta.

INDUSTRY.

Is a monthly Journal of Technology and Handicrafts, Science and Commerce, Agriculture and Business. The rate of subscription is as follows:—

Indian Rs. 3. Foreign Rs. 5-4.

The charge is for complete yearly volume only, inclusive of postage.

Single Copy As. 5 only.

BUSINESS NOTICE.

Industry is published at the end of every month.

Subscribers are enlisted at any time of the year but they will receive only the number from April to March comprising a complete volume for one year's subscription.

At the time of sending a V.P.P. only the current number is generally sent. The previous issues of the volume are sent per book-post on receipt of the value of the V.P.P. For particulars and Advt. rate please write to—

Manager, INDUSTRY OFFICE,
Shambazar, Calcutta.

Managing Editor—Mr. K. M. Banerjee.

MANAGING EDITOR — MR. K. M. BANERJEE.

INDUSTRY

A Journal of Technology Handicrafts & Commerce

Vol. XV. Calcutta, August, 1924 No. 173

Builders of Destiny.

THE case of a person losing the battle of life and assigning the reasons to the vagaries of fate is a pathetic one. It is part of human nature to try to explain away one's own deficiency and drawback. And what more suitable opportunity there is than that of ascribing one's failures to chance. Simple chance indeed !

In some instances no doubt the lot of the victim is pitiable but in majority of the cases the sufferers are themselves to blame. For they shirk their own responsibility and take it for granted that the stars are against them. They therefore submit to the decrees of fate and do not strive to alter their conditions. Their greatest mistake is that they always blink the facts they come across.

They would do well to remember the case of those who though placed by chance in very unfavourable circumstances not only manage to come out but live very successful careers. These builders of destiny do not wait for a fortuitous combination of circumstances but create their own field. Otherwise they would be still in the same rut in which they have been placed by fate. They are the persons whose creative thought is all the capital they possess and whose dynamic energy is the whole of their stock-in-trade. Their examples are worthy of emulation.

If you think yourself to be destined by chance to occupy a low status in life, then believe that by your own endeavour you may be destined to rise higher up the scale. Leave therefore nothing to chance. That person never achieved anything in this world who simply hoped for something to turn up. You shall have to go forth into the wide world and turn it up for yourself.

If you wish to make a mark in life you shall have to forsake the creed of fatality ; you shall have to face the circumstances boldly ; you shall have to win recognition for yourself ; you shall have to wrench your laurel from the hands of fate. In short you shall have to build up your own destiny.

INDIA'S INDUSTRIAL PROGRESS.

Dacca Button Industry.

The button industry of Dacca is in a sorry plight. It is reported that about 2,000 operators have given up their work. This is due to the very serious competition of the cheap Italian nut buttons which have practically captured the market. The Director of Industries, with a view to assisting the Dacca industry to meet the Italian competition, has obtained and communicated to the larger button firms information regarding the sources of supplies of nuts as well as information relating to the preservation of the nuts, recipes for dyeing of animal and vegetable buttons, an improved method of polishing, and the utilisation of the waste.

Textile School in Bombay.

A textile school is to be opened at Parel, Bombay, under the auspices of the Social Service League, as part of its working men's institute. A scheme for training workmen has been drawn up by a committee of experts and others. A number of looms, winding machines and machines for carding and spinning have been supplied free of charge by certain benevolent firms. Some more machinery and accessories are still required and the League is appealing for funds to meet these and other requirements.

Decline in Silk Industry,

It is a matter for regret that while Japan has made rapid strides in production, the silk output of India has been on a declining scale for many years past. Viewed from a world standpoint, the industry in India has almost ceased to count though fifty years ago she was one of the largest producers. This present unsatisfactory condition of affairs may be assigned to three main causes—climatic conditions, disease, and the ignorance of the agricultural population.

It has, however, got to be realized that the country possesses in many parts in a high degree the natural advantages which, if combined with effective organization, would enable it to become one of the principal silk-producing countries. In spite of the cloud which has settled on the industry, much of the silk produced possesses excellent natural qualities and if reeled by modern methods would yield a thread which would command a ready sale in European and American markets.

Bombay Cotton Industry.

The great Bombay cotton industry appears to be in serious difficulties. The ranks of non-dividend-paying mills are increasing in number and several cotton mills are closing down. The high price of raw cotton and lethargy of the piece-goods market are held to be responsible. Unless the cotton situation soon improves, Bombay's prosperity will be seriously affected. On this side of India, Bengal's leading industries, jute and tea, are in a satisfactory condition, as both jute products and tea continue to be in heavy demand abroad at profitable rates.

Wood Impregnation.

PROCESSES for the preservation of timber from decay, and from destruction through the boring of insects, may be classified under three headings : Drying artificially and hermetical protection from contact with the atmosphere by coating the surface with paint ; the elimination of the sap of the wood by dilution or vaporization ; the impregnation of the wood with some antiseptic chemical substance which will form an insoluble compound with the organic matters in the sap.

The first and second of the above methods are only valuable where the timber is comparatively thin and is not in contact with the ground while the third is the most important.

It must be remembered that as a rule chemical substances manifest their activities in solution, and are almost quiescent in the solid state. Therefore in order that an antiseptic agent should produce useful results in the preservation of wood it is absolutely necessary that it be in a proper liquid state at the instant at which injection into the wood takes place.

Moreover the wood to be treated should be in a proper condition, that is to say, properly seasoned, or at the very least half-seasoned.

In the most effective treatment, a preservative liquid is made to enter the lower end of the wood, to follow the natural course of the sap and replace it, at the same time acting on putrescible substances so as to prevent putrefaction, destroying organisms that may be present, and rendering the material unsuitable for the entry of fresh ones. The liquid may be either (1) made to enter by a head of fluid ; (2) forced in by additional pressure ; (3) drawn in by encasing the top with india-rubber or leather and establishing a vacuum above, while the lower end dips in the preservative liquor ; or (4) the timber may be enclosed in a strong cylinder which is exhausted and filled with liquid several times.

The second of the above methods is the quickest, but the first is said to give the most uniform penetration. The progress of the operation should be tested at intervals. If it has been properly conducted the timber is proof against insects and against the mycelium of disintegrating fungi such as dry rot.

There are various technical processes for carrying the above into practice on a commercial scale while the application of chemicals and other ingredients is covered by numerous patents. The only metallic salts that are effective germicides for this purpose are, in order of power, those of zinc, copper, and mercury though acids, sulphates, silicates, arsenic compounds have been employed. Among organic substances use has been made of asphaltum, creosote, lime ; oils ; salt, smoke, tallow ; tar, wax, etc.

Picture Frame Moulding.

IN comparison with the capital invested in picture frame industry, the outturn is higly astonishing. There is moveover a vast scope for the development of this industry, neglected up to this time. Persons accustomed to handling carpentry tools but who are in search of work may take to this pretty picture frame industry. It may seem rather difficult at first but with a little perseverance, success is certain.

To give a full description of the manufacture of picture frames with moulding machines worked by power, would require a very long article : hence the easier side of the subject, i. e., hand production by small capitalists only is treated herein.

THE TOOLS NEEDED.

Before beginning to work we must see that our tools are ready and in good condition. Here are the tools we need. Three planes for hand planing (one for mere planing, the other for rebâting and the third for moulding), one screw driver, one hand saw, one hammer with good claws, one iron vise fitted to the work bench, one sharpening stone and half a dozen varied files. We can add more to them as they are required.

THE MATERIALS REQUIRED.

We need teak wood battens, two wooden benches, two to three earthen jars with their lids for varnishes, shellac, sandrac, spirit, glue, half a dozen brushes, sand paper, plaster of Paris, cloth, cotton, China pots for colours and varnishes, one set scale with weights, one charcoal iron sigri etc.

For the two benches we must have now four stout posts about four to five feet high with sides of six or seven inches and two stout planks from twelve to fourteen feet long, one foot wide and two or three inches thick at least. Such posts and planks can be had quite cheaply at any wood yard.

Make the tops of the posts as well as the bottoms and top of the planks quite smooth and level and then sink the wooden posts one to two feet in the ground, pressing in the earth well all round the legs and then nail or bolt the said planks on to the tops of the posts. Thus you have two strong and stout benches made to begin your work with. One will be for moulding the battens and the other for polishing them.

It is well to have on hand a large quantity of teak wood battens before beginning the work : we may remember that any other soft wood will do as well. Hard woods are much more difficult to work. We can use cheap but soft wood and stain it to imitate any of the harder and more expensive wood. Here we have chosen teak only because it happens to be a wood that looks well without a great deal of polishing and because it is available in large quantities. We must select the best battens we can find, for the finish of the mouldings will depend very much upon the condition of the wood we use. It is a false economy to use battens which have knots, holes or which are marred and split. We must buy battens in lengths of five feet and upwards to twelve feet. One rule is "the longer the better." But the depth and width are, so to say, interdependent upon each other. Generally, but not necessarily, the proportion of the width is 1 : 2, i e., to put it plainly the width is double of the depth. Although the approximate proportions are given here, one must use one's own intelligence in selecting the marketable size. Thus by purchasing the ready battens the trouble of sawing out the planks is saved.

SAMPLES OF FRAME AND MOULDING.

If the novice be ignorant of what a frame is and what mouldings are, he may approach a dealer in picture frame mouldings and procure sample pieces, rejected or waste, which will serve his, purpose to know what marketable designs may be adapted in the manufacture of mouldings.

Now we suppose that we have secured the sample pieces of picture frame mouldings and shall see how we can adapt them to manufacture good mouldings. Taking any sample piece of moulding in hand, if we look at it, we will find that, however and whatever may be the shape of the ornamental surface, there is at the back of it a sunken edge all along one side which is technically called a rebate. When we frame a picture we put this rebate. inside next the picture, so that this forms a regular depression all round in which the picture and the glass lie.

From the description given above we learn what a moluding is and what we are to do with it : hence it is not a difficult matter to convert a batten into a moulding. If the moulding is to be made a plain one with a surface flat or nearly flat, it is quite a simple thing to plane off all the four sides and rebate all along one side ; but if the moulding is to have an irregular or ornamental surface, then mere planing all round will not do. This requires that the planer should be given the required shape of an ornamental surface to mould with and hence we call this planer the shaper or moulder.

PLANING, REBATING AND MOULDING THE BATTENS.

From the several patterns of different sizes obtained, which range from the most intricate and delicate model to the simplest flat frame, we choose a simple pattern (one inch wide and half an inch thick) to suit the common framing of the pictures and photoes.

Here we begin with a bit of carpentry of great value. In our carpentry work what we are to do is to transform plain and ordinary batten into a pretty picture frame moulding.

We have our tools and equipments, we have secured sized battens and we know the main features but one which concerns width and depth. When we talk of the width of the moulding it means either of the top or bottom while depth means thickness of the sides. Now it will not take long to mould the battens.

Take a batten off the bundle and place it lengthwise evenly on the bench meant for it ; choose the good looking side for surface and turn the batten upside down and plane it carefully and then rebate it all along one side ; which must be three-eighths of an inch wide and two-eighths of an inch deep. For smoothness and accurate width throughout plane off both the sides too. While you are planing or moulding the battens let your assitant hold the battens. Otherwise there is likelihood of the work being spoiled owing to shaking.

We have now finished the bottom, the rebate and both the sides but the top of batten. All that now remains to be done is to mould the top. The moulding in question has something ornamental on the surface. This ornamentation by means of embossing or decoration dies, is not within easy reach and is outside the limited finance. What we have is the much talked of moulder. With the files we have given the flat planer some thread-like depressions, curves and tapering. These will just carve out the surface of the batten to the aimed pattern.

The finished thickness of the moulding is only half an inch. By all along rebating one side we have reduced the thickness by two-eighths of an inch. If the taper is given to the moulding at all it is generally to the rebate side, hence we must be particularly careful not to exceed the tapering by even one eighth of an inch. That is all. Placed evenly on the bench the half finished moulding awaits completion. Mould the surface carefully and here we have a dainty moulding. All the battens should be treated in this way after which they are ready to be finished, stained and varnished. So also is the case with the still wider and equally thicker mouldings. The change in size means the change of band planes to suit the requirements. The process of manufacture from start to finish will remain the same.

Finishing the Mouldings.

We need few sheets of sand paper Nos. o, 1 and 2 to smooth the surface. As the battens are planed and moulded we must finish them with the sand paper. We should use No. 2 sand paper first, rubbing the surface and edges carefully until they are as uniformly smooth as the sand paper can make them, and then we should use No. 1 or o sand paper which will give them the final touches. It is more important to have the surface smooth because the former is more exposed to view.

Staining and Varnishing the Mouldings.

The wood battens that we have moulded to the required shape and finish now need be stained and polished for shining appearance. Before applying the stains, if there be any pores, holes, cracks or seams to moulding, putty them up. This filler or what is called "putty" is generally whiting or plaster of Paris made up to a paste with either water or turpentine or boiled linseed oil and coloured to match the final stain. The filler in question is rubbed in and allowed to dry and then the surface is sandpapered smoothly. Then the mouldings are ready to receive the first application of stain. Colours such as red, blue, green, grey, yellow, black, etc are used as stains.

Varieties of stains and varnishes for wood work are sold in the market ready for use in cans or bottles by all paint and varnish dealers. Selected stain may be put on with a brush or rubbed in with a rag. Generally two to three coats should be given, because with one coat it is not easy to keep the same shade of colour all over. In succeeding coats it should be borne in mind that weak stain alone is used and no next coat applied until the previous one has dried up. The surface must be sandpapered before the first coat and after each coat has thoroughly dried. Otherwise it will feel and look rough, for any thing which wets the wood causes its surface to roughen as it dries. This process being one of stain and varnish combined, our trouble of varnishing separately is over, hence we can go to polishing at once.

Polishing and Finishing.

Staining is done with a brush but now polishing is done with a rag. Polishing requires more skill and time, but it gives a smoother and glossier surface than varnishing. The rag used in polishing is called a rubber or pad. It should be a piece of soft white linen. We must see that this is used as an outer covering to a pad of cotton-wool. This cotton-wool is enclosed in the rag in question and the sides all round are drawn up at the top and the rubber thus formed should be held in hand with thumb and fingers only. The pressure on the rubber should not be heavy and a few drops of boiled linseed oil are put on the rag to make it move about freely without tendency to stick. In the first place it is necessary to cover the surface of the wood with polish as quickly as possible which is done by moving the rubber in large sweeps. The movement of the rubber must be entirely backward forward and lengthwise. After the polish has been applied to in this manner the moulding must be laid aside for drying, on specially made wooden racks.

There is now only the final process which is called glazing. The rubber is moistened with the sandrac polish and not the shellac varnish. The last movements of the rubber must be in straight lines parallel with the grains and not haphazardly in curves or backward and forward.

Cost and Estimate.

Cost of manufacturing one inch wide, half an inch thick and 500 running feet mouldings per day with materials and labour :—

	Rs	As.	P.
Cost of 500 running feet of teak wood batten Rs. 2-8 per 100 running feet.	12	8	0
Carpenter	1	8	0
Boy assistant	0	8	0
Polisher	1	0	0
Boy assistant	0	8	0
Polishing materials	1	2	0
Establishment expenses inclusive of the rent of premises	2	8	0
Sundries	0	4	0
Thus total expenditure for 500 running feet of frame mouldings comes to	19	14	0
Average selling price for 500 running feet of mouldings at Rs. 6-12, per 100 running-feet	33	12	0
Less cost of production	19	14	0
Gross profit about 70 %	13	14	0

ESTIMATE OF THE COMPLETE PLANT :—

	Rs.	As.	P.
Three hand planes at Rs. 3-8 each	10	8	0
One screw driver	1	2	0
One hand saw	1	4	0
One hammer	0	14	0
One iron vise	2	2	0
One sharpening stone	1	4	0
Half a dozen varied files	4	8	0
Two wooden benches at Rs. 10 each	20	0	0
Three earthen jars at Rs. 2-8 each	7	8	0
Half a dozen camel hair brushes at average cost of as. 8 each	3	0	0
One set scale with weights for accurate weighments of materials	5	0	0
One charcoal iron sigri for heating and liquifying purposes	1	8	0
Half a dozen small China pots for colours and varnishes at as. 12 each	4	8	0
Two jungle wood ordinary racks for drying the mouldings at Rs. 5 each	10	0	0
Six kerosine oil empty tins for storing polishing materials at as. 4 each	1	8	0
One deal wood box for instruments	3	8	0
Office furniture, etc.	50	0	0
Stationery	15	0	0
Initial installation expenditure	50	0	0
Working capital	300	0	0
	493	2	0

A workshop may be started with a capital Rs. 500 only.

CONCLUSION.

There is a wide market for the frame mouldings and the great demand of the public will easily ensure profit. For the rapid sale and circulation, correspondence will have to be made with the merchants of principal cities who can purchase the mouldings to the extent of thousands of rupees. Small capitalists may start this lucrative and honourable business and thus save money going out of India. Bombay alone imports foreign mouldings worth several thousands every year and Indian made frames can rarely be had in the market. Home industries started on the above lines may meet the local needs but for all India provision it is necessary that factories on large scale, by moneyed men, be opened. There are regular machines for manufacturing frame-mouldings. The minimum investment to run the factory of this kind, will amount to fifty thousand rupees.

—BY MR. P. R. NAIK.

Morabba Making.

(by a Practical Expert.)

MORABBA is an item of confectionery comprising fruits and vegetables preserved in sugar syrup. By preserving in this way, one is enabled to taste of one's choice fruit or vegetable out of season. When properly made morabbas are dainty things and are treated as rare delicacies Suri in Birbhum and Benares in the United Provinces are famous for morabbas.

In the preparation of morabbas the most important thing to learn is the preparation of sugar syrup. A quantity of clean white sugar is dissolved in water and the solution brought to boil. The scum that arises on the surface is removed with a ladle. To clarify the syrup more thoroughly a small quantity of raw milk may be sprinkled over. Three stages of the syrup are generally recognised : thin, thick and viscous. At the next stage it crystallises. The most suitable consistency for any article may be determined by experience.

In order that the vegetables and fruits may be thoroughly cooked and that syrup may enter and sweeten the inside, incisions must be made into them with any pointed implement such as the awl or fork.

Some articles are first boiled in water to make them tender ; the bitterness or pungency of others are first removed by soaking them in water with or without the addition of certain ingredients but all are finally cooked in syrup. The sugar serves as the preservative.

Among the utensils earthenware or other neutral vessels must be used. On no account should iron be employed. Wooden ladles should be used for stirring. Gentle heat should be employed throughout. Lastly the products should be packed in air-tight glass jars.

All kinds of fruits and vegetables may be preserved in this way. Sometimes herbs and roots are also made into morabbas. They are then taken by convalescents and patients with beneficial results.

PROCESS OF PREPARATION.

GREEN MANGO.

Mango	1	sr.
Sugar	2	,,
Lime (hydraulic)	3	tola
Salt	3	,,

Wash the mangoes, peel and core and cut into two or four pieces Make incisions in the pieces with a pointed fork. Then soak them in lime water for 1½ hours. Take out and wash in clear water. Besmear with salt and leave covered up in some plate for half-an hour. Next wash them in hot water and boil them in water in a pan until they are soft. Then strain out the water and pour thin sugar syrup. Continue to heat gently until the syrup becomes viscous. Leave aside for a time and bottle when cool. Whole mangoes stuffed with pistachios, almonds, etc can be preserved in a similar way.

RED BEET.

Beet	1	sr.
Sugar	1	sr.
Cardamom minor powder	½	tola
Rose Water	1	tola

First clean the beets and pare them. Make incisions with the fork and cut into pieces. Soak them in water for 1 hour, next boil them in water : ladle out when soft and allow to drip. Now prepare sugar syrup and cook the beet pieces on a slow oven. When the syrup is viscous add cardamom and rose water. Bottle when cool. Seal air-tight with molten pitch. It will keep for a long time.

WHITE PUMKIN.

Pumpkin cubes	1	sr.
Safeda	5	tola
Alum	1	,,
Cardamom minor powder	½	,,
Rose water	1	,,
Sugar	1	sr.

The pumkin must be of the white or *sanchi* (deshi) variety and at least one year old. Peel and core and cut into cubes.

Make incisions in them with the fork and soak in cold water for an hour. Then boil them in a solution in water of alum and safeda. Afterwards wash in clear water. Then prepare a sugar syrup and throw into it the boiled cubes. Cook for some time. Add cardamom and rose water when removing.

These pumpkin preserves serve as good dietary for patients suffering from bilious complaints.

BLACKBERRY.

Select large and plump blackberries. They must not be over-ripe. Wash them, besmear with salt and wait for 5 minutes but not more. Then wash them in hot water. Now prepare the syrup and when boiling throw in the berries. Apply slow heat and cook carefully. When the syrup thickens ladle out the berries and bottle when cool.

This preserve whets the appetite and removes inappetency. Efficacious for those who suffer habitually from bowel complaints.

ORANGE.

Peel the oranges and soak the separated cells in clear water for half an hour. Strain out the cells and dry them on a plate. Now prepare thin syrup ; throw in the cells into it and cook for some time until they become tender. Bottle when cool.

BAEL.

Unripe bael is required for the purpose. First pare the skin and cut into circular slabs. Reject the seeds and soak in cold water for one hour. Throw away the water and allow them to drip. Now prepare a sugar syrup and cook the pieces in it for some time. Arrange them side by side on a plate and when cool store in any suitable vessel.

These preserves of bael are very efficacious against diarrhoea and dysentry and other disorders of the bowel, in which cases they are generally prescribed.

PINEAPPLE.

Pare the pineapple, core the eyes and reject the central stalk. Cut into suitable slices. Then arrange a layer of these slices in a pan and strew over them sugar. Fill up the pan with similar alternate layers of pineapple slices and sugar. Some time after the juice of the pineapple will melt the sugar. Then place the pan on a slow oven and cook. Take away after some time and store away the whole thing. The cooking is to be repeated for a week. Finally pour a quantity of thick syrup and bottle.

GRAPES.

Grapes	1 sr.
Sugar	1 ,,

The grapes must be half-ripe. Reject the injured and the rotten ones. Then prepare the syrup and when boiling throw into it the grapes. Cook for some time and bottle when cool. This preserve is very nutritious.

PATAL (PULWAL)

Select large pulwals ; peel the skin and wash. Boil them in water until soft. Ladle out and allow to drip and make incisions with the fork. Now prepare thick syrup, pour the pulwals and cook until the syrup is viscous. Finally bottle.

RIPE PAPAW.

Select large, fleshy, ripe papaws, say of Ranchi, or Bangalore. But they must be tight and not pulpy. Peel the skin and core the seeds. Gently wash in clean water and cut into pieces. Now prepare sugar syrup and throw into it the papaw pieces. Cook carefully and remove when tender.

PEAR.

Pear slices	1 sr.
Safeda	5 tola
Alum	1 ,,
Cardamom minor powder	½ ,,
Rose water	1 ,,
Sugar	1 sr.

Peel the pears and core the seeds. Make incisions with the fork and cut into pieces. Soak them in cold water for one hour. Then boil them in a solution in water, alum and safeda. Ladle out and wash in clean water. Now prepare sugar syrup and throw the pieces into it. Cook in gentle heat ; when tender add cardamom and rose water and take off. Allow to cool on a separate plate and bottle when cool. This preserve is extremely palatable.

RAISIN.

Raisins	1 sr.
Sugar	2 ,,
Curd	1 poa
Salt	1 ch.
Lime (Pati)	One

First clean the raisins and wash them in water. Then soak them in water in an earthenware vessel for one hour. Strain them out and allow to dry. Next prepare whey by mixing the curd with water and soak the raisins in this whey for an hour. Then boil the whole and cook the raisins in whey. When the whey becomes discoloured, take off from the fire, throw away whey, wash the raisins in clean water. Now add lime juice, salt, and curd ; mix thoroughly and cook gently in thin sugar syrup. Bottle when cool. It is dainty and nutritious.

SATAMULI.

(Asparagus recemosa)

First clean and wash the roots. Make incisions into them with the fork. Next boil water in a pan and throw the roots into it. When they are thoroughly soft remove them and allow to drip. Now prepare sugar syrup. When it thickens cook the roots in it. Remove when viscous. These preserves are very nutritious.

AMLAKI.

(Emblic myrobalan)

Raw amlaki	1 sr.
Sugar	2 ,,
Curd	½ ,,
Salt	1 ch.
Pati Lime	One
Hydraulic lime	3 tola

First soak the amlaki in a vessel full of water for about 1 hour. Throw away the water. Repeat the process once more. Make incisions in the amlaki. Then dissolve half the lime in water and soak them in it for half an hour. Repeat the process once more wash the amlaki in water. Prepare a quantity of the whey by dissolving curd in water and soak the amlaki in it for 1 hour. Now boil the amlaki in the whey and when the whey becomes discoloured throw it away and again boil the amlaki in the remaining quantity of whey for one hour. Take away the amlaki, wash in clear water ; add a few drops of lime juice and a quantity of salt and curd. Finally cook them in thin sugar syrup in gentle heat. Pot it when cool.

This preserve cures acidity, indidigestion ; and whetens the appetite.

MYROBALAN.

First wash the myrobalans in clean water. Then thoroughly boil them for some time in water. When they are soft take off from the fire and allow to strain. Then make a few incisions in each. Now prepare thick sugar syrup and cook the boiled myrobalans in it thoroughly. This preserve is medicinal.

PEACH.

First of all wash them in clean water and make incisions into them. Then boil them in water and when soft take out and allow to strain. Now prepare thick sugar syrup and cook the peaches in this. This preserve is extremely toothsome and nutritious.

BOX DATES.

First wash the dates and allow to drip. Now prepare sugar syrup and carefully cook the date in it. When done remove to another plate and bottle when cool.

ROSEBERRY.

Reject the green tips on both ends of the berry but care must be taken not to make any hole. Then wash them in clean water and allow to drip. Finally cook in thin sugar syrup and bottle, when cool.

GLOSSARY.

Aegle marmelos (The Bengal Quince)	bael.
Alum	fitkiri.
Asparagus recemosa	satamuli.
Beet	beet.
Blackberry	kala jamun.
Cardamom minor	chhota elaich.
Curd	dahi.
Dates	khejur.
Emblic myrobalan	amlaki.
Grape	angur.
Lime (citrus fruit)	lebu.
,, (hydraulic)	chunam.
Mango	am.
Myrobalan	haritaki.
Orange	kamla lebu.
Papaw	papita.
Pear	naspati.
Pineapple	anaras, ananas.
Preserves	morabbas.
Raisins	kismis, monacca.
Rice powder	safeda.
Roseberry	gulab jamun.
Rose water	gulab jal.
Syrup	ras.
Whey	ghol.
White pumpkin	Sanchi kumra.

1 sr. = 16 ch. = 32 oz. = 2 lb.

1 ch. = 5 tolas.

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Taral Alta.

TARAL Alta is the Bengali name for a kind of fluid rouge, like lip-salve, for imbueing a rosy hue to the skin. It is universal custom in Bengal and elsewhere amongst Hindu women to paint their feet, palms of hand, finger-tips, etc. periodically with indigenous lac-dye. This decoration adds to the grace of feminine beauty. And for this purpose the service of the female barber has got to be requisitioned. But with the help of ready-made Taral Alta a lady can paint herself by simply applying the liquid dye with a swab.

Taral Alta is therefore now in great vogue: it commands a wide sale specially during marriage season and in times of festivities and its manufacture will therefore be found remunerative.

We append two sets of tried recipes for preparing scented Taral Alta. In the first group a chosen essential oil is macerated with magnesium carbonate in a stone mortar with a stone pestle. The mixture is then stirred in distilled water and the emulsion is filtered through blotting paper. This forms the basic perfumed water (a) in which a quantity of scarlet dye (b) is dissolved to produce Taral Alta.

In the second group a quantity of scented flowers is soaked in distilled water in a covered vessel for 24 hours by which time it will absorb their fragrance. The perfumed water (a) is strained through a flannel sheet and a solution in this of scarlet dye (b) yields Taral Alta as before.

In any case 1 oz of methylated spirit may be added to each quart of the product to impart it with quick drying property and 1 oz. of powdered gum arabic to ensure a good shine when dry.

The final products should be bottled in decent phials and corked and capsuled. A sponge swab with a wire holder should be inserted in every packet. The label should be printed in tricolour bearing attractive design. Instructions should be given first to wash the skin and then to apply uniformly with the swab and finally to allow to dry up.

I GROUP.

ROSE.

a.	Rose Otto	30 mm.
	Magnesium carbonate	1 oz.
	Distilled Water	12 quarts.
b.	Scarlet dye	2 oz.
	Perfumed water	1 quart.

SANDAL.

a.	Sandal Oil	1 tola
	Magnesium carbonate	1 oz.
	Distilled water	6 quarts.
b.	Scarlet dye	2 oz.
	Perfumed water	1 quart.

HENA. (Lawsonia)

a.	Hena attar	1 tola
	Magnesium carbonate	1 oz.
	Distilled Water	4 quarts.
b.	Scarlet dye	2 oz.
	Perfumed Water	2 quarts.

KHUS KHUS. (Vetiver)

a.	Otto of Khus Khus	1 tola
	Magnesium carbonate	1 oz.
	Distilled water	4 quarts.
b.	Scarlet dye	1½ oz.
	Perfumed water	2 quarts.

LAVENDER.

a.	Essential Oil of English Lavender	2 dr.
	Magnesium carbonate	1 oz.
	Distilled water	3 quarts.
b.	Scarlet dye	1 oz.
	Perfumed water	1 quart.

VIOLET.

a.	Heiko Violet	4 dr.
	Magnesium carbonate	1 oz.
	Distilled water	3 quarts.
b.	Scarlet dye	2 oz.
	Perfumed water	1 quart.

CHERRY.

a.	Oil of Cherry Laurel	4 dr.
	Magnesium carbonate	1 oz.
	Distilled water	2 quarts.
b.	Scarlet dye	2 oz.
	Perfumed water	1 quart.

LILY.

a.	Heiko Lily	4 dr.
	Magnesium carbonate	1 oz.
	Distilled water	2 quarts.
b.	Scarlet dye	1 oz.
	Perfumed water	1 quart.

II GROUP.

ROSE.

a.	Petals of the roses of one colour	$\frac{1}{2}$ lb.
	Distilled water	3 quarts.
b.	Scarlet dye	2 oz.
	Perfumed water	1 quart.

TUBE ROSE.

a.	Tube roses	4 oz.
	Distilled water	3 quarts.
b.	Scarlet dye	4 oz.
	Perfumed water	3 quarts.

BELA (Arabian Jasmine)

a.	Bela flowers	$\frac{1}{2}$ lb.
	Distilled water	3 quarts.
b.	Scarlet dye	2 oz.
	Perfumed water	1 quart.

JASMINE (Juin)

a.	Jasmine flowers	4 oz.
	Distilled water	2 quarts.
b.	Scarlet dye	2 oz.
	Perfumed water	1 quart.

CHAMPAK.

a.	Champak flower	50
	Distilled water	2 quarts.
b.	Scarlet dye	2 oz.
	Perfumed water	1 quart.

BAKUL.

a.	Bakul flower	5 tolas.
	Distilled water	2 quarts.
b.	Scarlet dye	2 oz.
	Perfumed water	1 quart.

Reeling and Spinning of Silk.

IN REELING silk a number of cocoons are thrown into a basin of warm water, in order to soften the gummy envelope of the fibres, thus permitting their ready separation from the cocoon, and also to cause the subsequent agglutination of whatever number of fibres may be thrown together to form a single thread. During this reeling process two threads, composed of an equal number of fibres, are passed separately through two perforated agate guides; after being crossed or twisted together at a given point, they are again separated, and passed through a second pair of guides, thence through the distributing guides on to the reel. The object of this temporary twisting or crossing is to cause the agglutination of the individual fibres of each thread, and to aid in making the latter smooth and round.

Spun silk is made from the waste silk covers of cocoons, from cocoons out of which the moth has broken its way, or of any raw silk, which for some reason or other cannot be reeled off. Indeed all the waste silk of whatever kind is collected together, torn to filaments, and spun in the same way as cotton fibre. It may be mentioned in passing that spun silk is a very useful and beautiful thread from which many most artistic and durable fabrics are to be made at a cost of about half the price of best silk.

Small Trades & Recipes.

Varnish for Musical Instruments.

The following is the method of preparing varnish for violins and other musical instruments. Dissolve over a moderate fire 120 parts of sandarac, 60 parts of shellac, a like quantity of mastic and 30 parts of elemi in 1500 parts of highly rectified spirit of wine and after the solution has boiled up several times add 90 parts of Venetian turpentine.

Carboy Colours.

Colours for carboys displayed in the the windows of Chemists and Druggists are made as follows.

GREEN.

Solution of nickel sulphate acidulated with sulphuric acid.

ORANGE.

Solution of potassium bichromate acidulated with nitric acid.

RED.

Solution of iodine acidulated with hydrochloric acid.

BLUE.

Solution of copper sulphate treated with excess of ammonia and diluted to the required tint.

Insect Killing Bottles.

Wide-mouthed jars are required for insect-killing bottles and these should be fitted with glass stoppers or box wood caps. A few pieces of potassium cyanide broken up small are placed on the bottom of the bottle and upon this is poured plaster of paris made into a cream with water and then allowed to set. The plaster being porous allows hydrocyanic acid to escape as a result of the decomposition of the potassium cyanide, and it is this gas collecting in the bottle that kills the moths, butterflies and insects placed in it. The gas generated is a poisonous one and therefore great care should be taken in handling the bottle.

Cracknels.

Cracknels are a kind of hard, brittle biscuit. They are made without either milk or water being used to mix the dough, eggs alone being employed for this purpose. Certain proportion of butter, sugar, and sesquicarbonate of ammonia are added to the mixture of flour and eggs, and the dough is baked in the usual way. The cracknels, when cut out are thrown into a boiler of boiling water, and in about two minutes they float to the top. They are then fished out and thrown into cold water, and then drained on cloths, panned, and fired in an ordinary oven at a high heat. In the firing, the ammonia carbonate, being very volatile, is driven off, and the cracknel thus assumes its spongy structure. Many other varieties of biscuits are rendered light and spongiform by the use of the sesquicarbonate of ammonia or of carbonate of soda, in conjunction with sour milk.

SCIENTIFIC AND INDUSTRIAL TOPICS.

Stimulating Plant-growth by Electric-light

The value of electric light for accelerating the growth of plants was conclusively proved in a long test recently completed by the Westinghouse Lamp Company. During the experiments many of the specimens exposed to electric light grew to approximately twice the size of similar plants receiving day light only and were considered by experts to be from 2 to 4 weeks in advance of normal growth. Except for illuminating purposes no use of artificial light can be of greater benefit to humanity than this recently developed application to the stimulation of the growth and development of plants and vegetables.

The Size of the Universe.

A learned astronomer has calculated the size of the universe adopting Einstein's relativity theory. The volume of this universe, expressed in (cubic centimeters) is 7 followed by 41 ciphers divided by the mean density of matter to the 3/2 power ; while the mass is 7 followed by 41 ciphers divided by the square-root of the mean density. The radius of the universe is one million times ten million times the distance from the earth to the sun (93,000,000 miles). The weight of the universe, in grams, would be 1 followed by 54 ciphers. The weight of the universe bears the same relation to the weight of the whole earth as the latter bears to a kilogram. Lastly it would take a ray of light, travelling at the rate of 186,000 miles per second, one billion years to go around the universe.

Paper Saws for Wood Veneers

Circular saws made of paper for use in making veneer and fine furniture, are manufactured by a British firm Thin plates of wood cut by these saws are so finely finished that cabinet makers do not have to plane them at all before they are used. They are manufactured from a special type of compressed drawing paper and are driven by an electric motor.

Petroleum Oil from Rosin.

The Japanese chemists have been experimenting for quite a long time to produce petroleum synthetically. They have had quite some success in making petroleum from fish oil. Japan does not possess any extensive oil fields and so has to import its oil from Europe and America. In the attempt to provide means for manufacturing petroleum from natural resources so as to fill her oil needs, an investigation was made to see if it were not possible to convert rosin into petroleum. The process has been reported a success. It consists in heating the rosin with acid earth, silicate of magnesia, under ordinary pressure. The oil, that is obtained by this treatment varies in colour from a pale green to a water-white,

Testing Gasoline with Molasses.

Suggestion has been made for the detection of the presence of water in tanks of gasoline by the application of molasses. The principle involved is that water, being heavier than gasoline, will always sink to the bottom of the tank. In making the test a wooden stick is coated with molasses and this is pushed down into the suspected gasoline. The gasoline does not affect the layer of molasses in any way but, when water is encountered, the coating comes away from the stick. Thus when the stick is withdrawn it is not only possible to see whether water is present but the actual amount is plainly shown by the height of the bare section at the bottom of the stick.

The Pocket Seal-Press.

A novel pocket seal press has been put on the market. It looks very much like an ordinary watch case, the places on the inside ordinarily occupied by the dial and mechanism being filled by the two faces of the press. Even the handle is designed like that of a watch so that when closed and put away, one has in one's pocket, to all external appearances, a watch. In use, the paper to be stamped is placed between the two faces, which are closed down upon it, and with a little pressure with the fingers the impression is sealed on the paper.

The Sahara Sea.

The Sahara Desert was once the bed of an inland sea and it is conjectured that there is still a sea underneath it. According to a French report there is animal life 200 and 300 feet beneath the burning sands of the Sahara Desert.

That is the extraordinary discovery made by the experiments of sinking artesian wells at various points in the North African waste with a view to possible irrigation. Waters drawn from great depths were found to contain small crabs, fish, and shell fish, alive. The discovery is proving an absolute puzzle, no theory so far seeming entirely satisfactory.

It has been possible usually to explain the presence of fish and shell-fish in underground waters by the fact that they were locked up during some primeval cataclysm. Those found underneath the Sahara belong to a species inhabiting the lakes of Palestine. Shafts sunk during the past few years in the Sahara prove there are large sheets of water everywhere. Animals found now prompt the belief that there is a vast underground sea, densely inhabitated.

Map Making from the Air.

When aviation was first developed many people prophesied that it would prove very useful in the making of maps. It seems a simple thing to fly over the country and take a series of photographs which can be pasted together to make a complete pictorial map. Nevertheless there are many difficulties in the way of doing this operation with scientific accuracy. It is far from easy to keep an aeroplane level on a straight course. If a pilot keeps his eye on the horizon to maintain a level, he cannot at the same time search the ground below. This and other problems have been carefully investigated during the last two and half years by a professor of Cambridge University, England, on behalf of the British Air Force and the military authorities. Very ingenious means have been adopted with such success that it is now possible to keep the direction and level of an aeroplane constant within one hundred feet and also to keep the camera vertical within two degrees. Direct mapping has been found successful where the hills were not above six hundred feet; and other conditions of successful working have been exhaustively studied.

FORMULAS, PROCESSES & ANSWERS.

Embossing on Glass.

1220 M. H., Hyderabad. Asks for a process of embossing on glass.

Embossing on glass is effected with the help of acids, (1) hydrofluoric acid producing a surface like waxed paper, (2) French or white acid producing a surface like ground glass. First clean the glass sheet and sketch upon it with French chalk the desired design and lettering. Then paint Brunswick black over the whole surface excepting the sketching which is to be dull. Place the glass flat and level and build around its contour a little wall with beeswax. Now gently pour on the white acid (undiluted) to a depth of about one-eighth of an inch. The acid begins to attack all the glass left unprotected by the black paint. Leave the whole undisturbed for half an hour after which period the design will show up dull. Make a small opening on one corner of the wax wall and carefully pour back the unused acid into the bottle to be used again. Then with the help of turpentine scrape off the paint. On cleaning the surface the design will appear quite distinct.

Shading is similarly produced. As before cover up all the glass with Brunswick black, excepting the portion that it is desired to shade, and including, of course, the parts already dulled. Build up the wall again and pour on hydrofluoric acid mixed with an equal quantity of water. Wait for 15 to 20 minutes, pour back the excess acid, remove the black and thoroughly clean the surface of the glass.

Gold Recovery.

1238 P. V. S., Dharwar. Writes: "Could you furnish me a simple method of recovering gold from electroplating solutions ?"

(1) The gold may be recovered from exhausted stripping baths by evaporating them to dryness and fusing the residue with a little carbonate of potash or soda.

(2) Cyanide gilding solutions shold be evaporated to dryness, the residue then finely powdered and intimately mixed with an equal weight of litharge (oxide of lead) and fused at a strong heat; the lead is extracted from the resulting button of gold and lead alloy by warm nitric acid, when the gold will remain as a loose brown spongy mass. The operation should be carried on carefully in open air as cyanide is a poisonous substance.

Distemper Colours.

1318 C. S. R., Bezwada. Wants recipes for distemper colours.

Distemper is the name for all colouring mixed with water and size. White distemper is a mixture of whiting and size The mixing may be effected by the following method. Take 6 lb. best whiting and soak it in soft water sufficient to cover it for several hours. Pour off the water, and stir the whiting into a smooth paste, strain the material and add 1 qt. size in the state of weak jelly ; mix carefully, not breaking the lumps of jelly, then strain through muslin before using ; leave in a cold place, and the material will become a jelly, which is diluted with water when required for use. Sometimes about half a tea spoonful of blue black is mixed in before the size is added. When the white is required to be very bright and clean, potato starch is used instead of the size. Coloured distemper is tinted with the same pigments as are used for coloured paints, whiting being used as a basis instead of white-lead or zinc white. In mixing the tints, the whiting is first prepared, then the colouring pigment, the latter being introduced sparingly : size is added, and the mixture is strained. The colours are classified as (1) common, (2) superior, and (3) delicate. For the different shades of drab or stone colour yellow ochre, umber, black and red are used and for shades of blue, from the French grey to sky-blue, ultramarine, etc.

Tests for Precious Stones.

1380 S. L. C., Lansdowne. Writes, "Could you furnish some simple methods for testing the genuineness of diamonds and other precious stones ? "

The genuine precious stone may be distinguished from glass imitations in a simple manner by the employment of a file, the use of which could have no effect upon the diamond or upon any precious stone harder than quartz, unless by some rough handling a fracture might be caused. Such a fracture is particularly liable to occur at the girdle, the thinnest part, where the test is usually applied because the result would not there be visible in a set stone. Besides their comparative softness, these imitations differ in specific gravity from genuine gems, they are not pleochroic as are the majority of gems, and the microscope reveals the lines, streaks, and bubbles usually present in melted glass. True gems are colder to the touch than glass, as a rule ; although this distinction might prove too fine and sensitive to be relied upon by the layman. Again real gems when breathed upon, acquire a thicker coating of moisture than glass and lose it more quickly. The above is a physical test. The following chemical test was published in a journal on jewellery. This test is applicable to a number of minerals and requires careful manipulation. Hydrofluoric acid or "white acid" (a mixture of ammonia and hydrofluoric acid) is used for the purpose. As the acid is very injurious, contact with the skin must be avoided. The stone to be tested is handled with forceps and immersed one minute in the acid ; then it is removed and the acid washed off The test is applicable only to diamond, ruby, sapphire, spinel, emerald, aquamarine, precious topaz, tourmaline, garnet, and kunzite, which are unaffected by the hydrofluoric acid, The test is not applicable to turquoise and opal, which are rapidly etched or eaten away by this acid, nor to peridot and the quartz gems, as amethyst, false topaz, crystal, agate, etc., which have their surfaces dimmed and require repolishing. Both the genuine and artificial ruby are unaffected while all imitations made of paste, as imitation ruby, sapphire, emeralds etc., are quickly attacked.

Sachet Powders.

1348 M. G. A., Ambala City. Wants recipes for sachet powders.

(1) Herbaceous sachet powder.

Calaums root	4	lb.
Caraway	2	lb.
Lavender	4	lb.
Marjoram	2	lb.
Musk	120	grains
Cloves	11	oz.
Peppermint	2	lb.
Rose leaves	4	lb.
Rosemary	14	oz.
Thyme	2	lb.

(2) Indian Sachet Powder.

Sandalwood	7	oz.
Orris root	42	oz.
Cinnamon	21	oz.
Oil of lavender	150	grains
Cloves	60	,,
Oil of rose	300	,,

Alta from Lac.

1280 C. L. S., Berhampore. Wants to prepare *alta* from lac.

Lac-dye is largely employed in various parts of Bengal by Hindu women as a cosmetic for dyeing the soles of the feet, and the palms of the hands or tips of the fingers, taking the place af *mehudi* or henna which is almost universally employed for that purpose. To prepare this cosmetic, pieces of stick-lac are bruised in water, and cakes made either of cotton or of the similar floss covering the seeds of *madar* or *akanda* are steeped in the water, so that the fibres may absorb the dye These are the cakes used as cosmetics either by melting them and rubbing them on the hands and feet, or else by soaking them in water and applying the water to the skin. These cakes are called *alta*.

Waterproofing by Rubber Composition.

1351 A. M. B. I., Dolosbage. Requests us to publish a process of making waterproofs with rubber composition.

One part of finely divided india-rubber is dissolved in two parts of a hot mixture of benzene and linseed oil ; and then 3 parts of Japan wax is added. When these ingredients have been thoroughly mixed a small quantity of a concentrated solution of liver of sulphur is worked in. The whole mass is then stirred in a boiling mixture of olein, linseed oil and rosin. Finally, the mass is saponified to a neutral, potash soap with caustic potash lye. The proportions should be so adjusted that the finished product may contain 10 per cent of india-rubber. The benzene and india-rubber form a perfect emulsion. The soap should be superfatted with from 5 to 10 per cent of palm oil, added to it in a state of fusion. The product is employed in what is known as the soaping process of waterproofing fabrics which is effected with the help of elaborate machinery. It is used hot for the purpose but must not be heated by direct steam.

The fabric to be waterproofed must be quite free from excess of acetic acid, but need not be perfectly dry. It is drawn through the emulsion and as the soaping proceeds its strength is kept up to the required standard by the addition of hot, strong soap solution. The soaped pieces are next passed through a weak solution of alum or sulphate of alumina when an insoluble alumina compound is formed on the fibre, which imparts to the fabric the necessary moisture resisting qualities. The treated fabrics are not rinsed but allowed to dry for a few weeks after which they are brushed. Finally they are calendered.

Oil Stains from Hats.

1289 S. K., Bezwada. Wants a tip for removing oil stains from hats.

Oil stains on hats may be removed by dropping one drop of benzene or sapine on each spot and then rubbing it briskly with a piece of cloth until the same is removed.

Renovating Old Silk.

1337 V. L., Madras. Asks how to renovate old silk.

Sponge faded silks with warm water and soap, then rub them with a dry cloth on flat board ; afterwards iron them on the inside with a smoothing iron. Old black silks may be improved by sponging with spirits ; in this case, the ironing may by done on the right side, thin paper being spread over to prevent glazing.

Preserving Eggs.

1346 A. N., Lashkar. Desires to know the process of preserving eggs.

The simplest way of preserving eggs is to coat with molten paraffin and to let the coating dry up. One pound of paraffin will be sufficient for 1500 eggs. Only fresh and sound eggs must be so treated as otherwise the labour will be useless.

Making Matches Dampproof.

1338 S. N. G., Cuttack. Needs some hints for making matches dampproof.

The problem of making matches dampproof largely depends on the quality of adhesives employed. Ordinarily glue is used for the purpose. Now glue is generally made moisture-proof by treating it with potassium dichromate but the property will be better attained by treating it with ammonium dichromate. The most satisfactory results will however be attained by altogether substituting pure casein for the glue which will yield dampproof composition. Moreover, it is now manufactured in India and is cheaply available. The dampproof glue specially intended for match making and offered by certain chemical manufacturers of England may also be given a trial.

Baking Powder.

1328 A. R., Khurja. Wants a recipe for Baking Powder.

Take

Tartaric acid	2 lb.
Bicarbonate of soda	3 lb.
Flour	3 lb.

Powder the above ingredients and thoroughly dry separately by gentle heat. Mix them in a dry place, sift the mixture, and at once put into packages. This will yield a good baking powder for raising flour in the preparation of bread and cake.

Frosting Glass.

1220 M. H., Hyderabad. Wishes to change the appearnce of a glass sheet to ground glass.

Prepare a solution by mixing together in equal quantities fluoric acid, ammonium fluoride and barium fluoride. This is to be effected in lead or gutta-percha vessel. First free the glass sheet to be frosted from greasiness. Lay it in a dish made of lead and pour the above solution gradually on it. Leave aside for a couple of hours. The composition is commonly known as white or French acid and will frost any glass, making it look like ground glass in a short time.

Sugar Coating Pills.

2891 A. S. Balaghat. Writes, how to prepare sugar coating pills and how to remove ink stains.

For the sugar coating of pills certain appliances are necessary. The pills are carefully dried, placed in a round-bottomed copper pan, a mixture of syrup and starch added, the whole heated, and the pan kept moving constantly so that a rotary motion is imparted. While evaporation takes place, additions of syrup are made from time to time, so that a crust of sugar gradually forms upon the surface of each pill.

To Remove Ink Stains.

(1) The fabric is soaked in warm water; then it is squeezed out and spread upon a clean piece of linen. Now apply a few drops of liquid ammonia of a specific gravity of 0·891 to the spot, and dab it next with a wad of cotton which has been staturated with dilute phosphoric acid after repeating the process several times and drying the piece in the sun, the ink spot will have disappeared without leaving the slightest trace.

(2) Take equal parts of cream of tartar and citric acid, powdered fine, and mixed together. Procure a hot dinner plate; lay the part stained in the plate, and moisten with hot water; next rub in the above powder with the bowl of a spoon until the stain disappears. Then rinse in clean water and dry.

Preparing Silicic Acids.

1375 D. P. G., Cutch. Asks how silicic acids can be made.

The soluble alkali silicates when treated with hydrochloric acid yield a gelatinous mass of orthosilicic acid of the same character as that obtained from silicon fluoride and water.

This normal silicic, when washed and dried in the air, loses oue molecule of water and is transformed into amorphous metasilicic acid, which when heated to redness loses a further molecule of water, leaving silicon dioxide. Since gelatinous silicic acid is slightly soluble in water, in dilute hydrochloric acid, and in soda, if a little sodium silicate is poured into dilute hydrochloric acid, gelatinous silicic acid is not separated but remains in solution together with the sodium chloride formed and with the excess of hydrochloric acid. In order to separate the aqueous solution of these compounds from the silicic acid a dialyser is employed.

Numerous polysilicic acids are known. in the form of salts or as natural silicates, and that they may be supposed to be formed by the condensation of two or more molecules of silicic acid with simultaneous loss of one or more molecules of water. It is these polysilicates or polysilicic acids which actually exist in opal, agate, chalcedony, amethyst, etc. Many silicates corresponding to metasilicic acid are known as wollastonite, enstatite, etc. while the many metallic silicates corresponding to orthosilicic acid occur as olivine, fayalite.

Gelatinous silica (hydrogel form) is also obtained by the action upon alkali silicate solutions of oxalic, sulphurous, carbonic, and boric acids and the physical properties vary with the conditions of precipitation, particularly its solubility in water.

Silicon Compounds with Boron and Phosphorus.

The same gentleman wants to prepare silicon compounds with Boron and Phosphorus.

(a) Silicon and Phosphorus. Silicon phosphide is formed by the action of phosphine upon silicon chloride. Again when precipitated silica is dissolved in fused metaphosphoric acid, and the mass extracted with water, transparent, colourless octahedron of silicon phosphate are obtained.

(b) Silicon and Boron. Silicon triboride and silicon hexaboride are produced by heating 1 part of boron with 5 parts of silicon electrically in a crucible for about a minute. The residue after treating with a mixture of nitric and hydroflouric acids, then with hot potassium hydroxide, and finally with dilute nitric acid, yields the two borides.

The hexaboride is readily oxidised by boiling nitric acid, while the triboride is very slowly attacked, but the latter is decomposed by fused potassium hydroxide, which leaves the former unchanged. Thus both can be obtained in pure condition.

Paint Manufacture.

1372 D. E. D., Gadag. Requests us to describe the process of paint manufacture.

Paint is a composition of certain pigments ground in oil. The pigments comprise barytes, lead and zinc oxides, ochres etc. The oil employed is chiefly linseed oil, raw or boiled.

The modern methods of making mixed paint are divided into two classes, which depend upon the specific gravity and fineness of the raw material.

One of the methods employed is to mix the raw material with sufficient linseed oil to form a very heavy paste, the proper tinting material being added during the process of mixing. This paste is then led down from the floor on which it is made into a stone mill and ground. Even when the mill is water cooled, the mass frequently revolves at such a speed that the paste paint becomes hot. It is then allowed to run from the mill into a trough called the cooler, or is stored in barrels to be thinned at some later time. In case the operation is continuous and the paste is thinned at once, it passes from a stone mill to a mixer below which contains the requisite quantity of thinning material composed of oil, volatile, thinner, and drier, where it is intimately mixed by means of paddles. It is then compared with the standard for shade, and if the tone should not be identical with the former mixing, either tinting material or pigment is added in sufficient amount to produce the proper shade. From the last mixer, known as the "liquid mixer," the paint is drawn off, strained and filled into packages.

The other method in use is to mix and grind the pigment in paste form, using the same style of mixer ; but instead of a liquid mill a paste mill is used. Situated at the back of this paste mill, and close to the discharge scraper, is a steel tank of generous dimensions into which the ground pigment is discharged. This steel tank is provided with a stirrer for mixing the ground pigment with the oil and other thinners that are added to it, in order to reduce it to a liquid form. It is then carried to the tinting tanks by a pipe line.

Preparing Camphor.

1347 M. S. S. K. A., Mayavaran. Wants to learn the process of preparing Camphor.

The following process of preparing camphor is adopted in Formosa, its biggest producer.

Camphor is derived from the tree *cinnamonum camphora*. The shrubs are selected for the abundance of their sap. The branches and refuse are taken, while freshly cut, and chopped up into little pieces for distillation. The stills, built up in sheds are of very rude construction ; over 8 or 10 hearth fires, is placed a long wooden trough, often a hollowed tree, coated with clay and half filled with water. Boards pierced with holes are fitted on the trough, and above these are placed jars containing the chips ; the latter are surmounted by inverted earthenware pots, and the joints are made air-tight by means of hemp packing. When the fires are kindled, the generated steam passes up through the pierced boards and, saturating the chips, causes the sublimated camphor to settle in crystals on the inside of the pots, from which it is scraped off, and afterwards passed through a second process of distillation to remove some of the impurities. At the bottom of a copper still, is placed a bed of dry powdered earth and on this a layer of crude camphor, this is again covered with earth, and soon alternately till the vessel is full, the series terminating with a stratum of earth, and being finally covered with green mint. A second vessel, usually formed of straw smeared with clay on the outside, is inserted over the still and luted on. The apparatus is placed over a regulated fire, and the contents are heated for a considerable time. After cooling the camphor is found to have sublimed, and attached itself to the upper vessel.

Flake and Pearl Tapioca.

724 R. S. R., Chickvallapur. Writes how to make flake and pearl tapioca.

In making flake tapioca the damp flour is spread in thin layers on large rectangular tables and rolled into flat blocks, which are placed in round pans about 24 inches in diameter, and subjected to heat. In a few minutes the grains, commencing to adhere to the metal, are removed with spatulas to prevent sticking and hasten drying. Finally, they gelatinise and take on their well-known vitrious appearance.

After cooling the process is completed by drying and bleaching in the sun. The pieces of flake are sifted into various sizes, the largest being crushed in specially designed mills and the finest being marketed as "siftings." Flour, flake, and siftings are all packed is wooden barrels as protection against moisture and to prevent the flake crumbling.

Pearl tapioca is made by pressing the damp flour through perforated plates; thus strings like vermicelli are formed. Falling on steam heated plates they are mechanically rocked, and, tumbling over one another, they gelatinise and form pearls. The factory waste forms a carbo-hydrate food eminently suitable for stock when mixed with materials containing fat or protein.

For patriculars apply to :—
Mr. A. P. GHOSE, M.S.C.I. (London).
Consulting Match Expert.
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CALCUTTA

Gold Enamel Paint.

1360 B. S., Nellore. Requests us for a good formula of gold enamel paint.

White-hard varnish	4	gal.
Alcohol	3	,,
Gold bronze	48	lbs.
Mica, finely powdered	12	oz.

Mix the varnish and alcohol; mix the mica with the gold bronze, and add to the first mixture.

Blue Black Ink for Fountain Pen.

1356 B. B. L. K., Ambala. Wants a good recipe for fountain pen inks.

Gallic acid	8	gram.
Ferrous sulphate	12	,,
Phenol blue	2	,,
Gum acacia	16	,,
Dilute sulphuric acid	24	minims
Liquefied phenol	3	minims
Glycerine	14	,,
Distilled water to make	2	fl ozs.

The ferrous sulphate, gum acacia, phenol, glycerine, and dilute sulphuric acid are dissolved in 8 oz. of the water, without heat. Dissolve the gallic acid in 5 oz. of the water, using gentle heat; raise to boiling point, and add the first solution gradually, shaking after each addition, make up to 20 fl. oz., filter and add phenol blue, shaking until dissolved.

Decoction of Chamomile.

805 K. S. B. Karauli State. Asks how can decoctions of Chamomile be prepared ?

(a) Simple.

Chamomiles, 1 oz ; boiling water, 1 pint ; digest for 10 minutes, simmer gently for 2 or 3 minutes longer, and strain with pressure.

(b) Compound.

Chamomile flowers (dried), ½ oz ; fennel seed, 2 dr ; water, 16 oz ; boil for a short time and strain.

Both the above are bitter, stomachic and tonic ; the last is vermifuge. They are chiefly used as fomentations and clysters.

Red Phosphorus.

1452 M. R. R., Madras. The method of manufacturing red phosphorus follows as desired by you.

The following account of Red Phosphorus is culled from the Industrial Chemistry by Martin. Red phosphorus is sometimes termed as amorphous phosphorus, though it forms hexagonal crystals and is slowly produced when white phosphorus is exposed to light. It is more rapidly produced by heating ordinary phosphorus in a vacuum at 300°C, or with a trace of iodine at a lower temperature.

On a manufacturing scale it is prepared in Alberight's apparatus, which consists of a cast iron vessel containing an inner porcelain chamber, the top of which can be screwed down. The space between the inner and outer chamber is filled with sand and the iron vessel also rests upon a sand bath, which is heated for eight days at a temperature of 230°-250°C. From the top of the porcelain chamber containing the soluble phosphorus there passes a bent tube, the end of which dips into a trough of murcury to form a seal.

At the end of the operation a mass of red phosphorus mixed with unaltered white phosphorus is left in the chamber. By boiling the mixture with sodium hydroxide solution the white phosphorus is converted into phosphine which escapes leaving the red phosphorus unaltered.

Uses of Neem Oil.

1584 B. T. Bavangere. Writes, please let us know for what purposes neem oil is used.

A fixed, acrid, bitter oil, deep yellow, and of a strong disagreeable flavour is extracted from the seed of the margosa tree (neem) by boiling or pressure. It is employed medicinally as an anthelmintic and antiseptic, and is also considerably used by the poorer classes for burning in lamps, but is said to smoke offensively.

The oil has proved a useful local stimulating application in some forms of skin disease, ulcers, rheumatism, sprains, etc. and is antiseptic. It is also a useful adjunct to chaulmugra oil in cases of leprosy. Its antiseptic property has been taken advantage of for the manufacture of a medicated soap, since the oil readily saponifies. The soap is very serviceable for the purpose of washing sores, etc , and for the general uses to which carbolic soap is now put. Another interesting use of the oil is that in Madras about an ounce is given to every woman immediately after she is delivered of a child. The oil of the seeds is useful for the destruction of lice The oil is applicable in rheumatism and in skin diseases.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of INDUSTRY are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

681 L. D., Amritsar. Formula of python eggs will appear in September issue. Process of paper slate making appeared in April 1921 issue. Method of preparing crucibles for alloys will be found in October 1923 issue. Formula of watch oil was out in September 1922 issue. An article on Electroplating at Home appeared in November 1923 issue.

708 P. R. S., Madura. Laundry machinery may be bought of Messrs Symington Cox & Co , Mercantile Bldg., Calcutta. Cement gun may be supplied by Cement Gun Company, Allen Town, Pennsylvania, U. S. A. Process of preparing tracing cloth appeared in October, 1921 issue. For hair oils you may consult Hair Oils published by INDUSTRY Office, Shambazar, Calcutta.

740 M. S., Chittagong. For syrups you may go through Manufacture of Syrup to be shortly published by INDUSTRY Office, Shambazar, Calcutta.

1219 T. K. L , Noakhali. Filter your ink through filtering paper or blotting paper before bottling.

1235 M. K. S. A., Indore. An article on glass manufacture will appear in an early issue of INDUSTRY.

1248 S. S., Jwalapur. Process of preparing butter appeared in June 1924 issue of INDUSTRY.

1303 P. B , Vartej. Chemical plants may be supplied by The Thermal Syndicate, 28, Victoria Street, Westminister, London.

1304 B. K V., Poona. Please refer your query to Messrs Andrew Yule & Co. Ltd., 8, Clive Row, Calcutta.

1305 P. S G , Tanjore. For starting match factory you may consult Mr. A. P Ghosh, 42, Beniapuker Road, Entally, Calcutta. For glass cutting apparatus enquire of Messrs N. G. Mitra & Co., 135, Chandney Chuck, Calcutta.

1306 M. E. S., Chittoor. Match machine manufacturers train apprentices.

1307 P. R., Natarajapuram. Button making machines may be had of Bengal Small Industries Co., 91, Durga Charan Mitter Street, Calcutta. Automatic looms may be bought of Messrs B. D. Bery & Co., 43, Ripon Street, Calcutta.

1309 N. C. P., Mehmedabad. Perfumes for soaps may be had of Messrs. Sikri & Co., 55-8, Canning Street, Calcutta. For soap colours write to Aminchand Mehra & Sons, 34, Armenian Street, Calcutta. Collapsible tubes may be bought of Venesta Ltd, 1, Great Tower, London, E. C. 1. Rates are occasionally fluctuating so please correspond with the dealers in neem and mahua oils and tallow for their quotations. For neem oil write to B. K. Paul & Co, 1-3, Bonfield's Lane, for tallow to Calcutta Tallow Mart 19. Tireeta Bazar Street, both of Calcutta and for mohua oil to Parbhu Das Kashiprasad, Dhamtari and Changna Marwari, Mohol, Manbhum. You may consult the formula books on hair oils to be had of Book Depot., Industry Office, Shambazar, Calcutta. The chemicals you have mentioned are used for various purposes, the best thing for you would be to consult a manual on chemistry.

1311 V. G., Berhampore. Picture framing moulds are not available in India. Cayenne peppers are chillies small in size but very pungent.

1313 A G. G., Gokarn. For ferrotype positive cards enquire of Calcutta Camera House, 158, Dharamtola Street, Calcutta.

1319 V. S., Thakurdwara. There are various gold mines in India viz., Balaghat Gold Mines Ltd., Coromondel, Dist. Kolar ; Eastern Development Corporation Ltd., Oorgaum, Kolar ; Mysore Gold Mining Co. Ltd., Marikuppam, Mysore State and many others.

1321 K. S. G., Jaipur. Canes may be supplied by Malayan Cane & Timber Co. 10 Sukea's Lane and Overseas Cane Supplying Co., 102, Doctor Durga Charan Road ; both of Calcutta.

1322 L. N., Pilibhit. The following trade journals may serve your purpose : British Dominions Trade, 15, Bedford Street, London W. C. 2 ; The Chamber of Commerce Journal of Yokohama, 5, Houche, Itchome, Yokohama, Japan ; The Empire Mail, 212, High Holborn, London W. C. 1 ; Commerce Monthly published by National Bank of Commerce, New York, U. S. A. and Commercial America, 34th Street, Below Spruce, Philadelphia, U. S. A. 100 dollars is equal to Rs. 314. The British Journal of Photography, 24, Wellington Street, Strand, London W. C. and The Amateur Photographer and Photography, 20, Tudor Street, London E. C. 4.—these two journals dealing with photography may be of use to you. For negative paper enquire of the Calcutta Camera House, 158, Dhuramtala Street, Calcutta.

1323 A L. L., Maldah. For securing agency of corrugated tin sheet please correspond with Anandji Haridas & Co., 20, Darmahatta Street, Calcutta. To create markets for new unknown article in foreign countries such as England, America and Japan either you will have to go there or you will have to engage reliable canvassers and representatives who would advertise vigorously on your behalf. To engage agents you may advertise in the columns of COMMERCIAL INDIA, the sister journal to INDUSTRY.

1324 B. N. D. B., Cuttack. 'Be' stands for a certain scale of measure calculated by an instrument known as Beaume's Hydrometer used for measuring density of liquid. Process of preparing soap lye appeared in August 1922 issue. Formula of preparing alcohol from rice will be found in April 1924 issue. For magnesium wire enquire of Orient Fire Works Co, 85-1, Upper Circular Road, Calcutta.

1325 J. R. D. K., Hafizabad. Telescope may be supplied by Messrs Adair Dutt & Co., 22, Canning Street, Calcutta. For ice cream making plant write to Messrs Srischandra Dass, 198, Old China Bazar Street, Calcutta.

1326 N. V. R. K. R., Pedapatnam. Glass bottles may be supplied by Kasai Brothers, 2, Chome, Sanuomiyacho, Kobe, Japan ; Guntsche & Co., Rudolstadt, Thuringen, Germany and Bellaire Bottle Co, Bellaire, Ohio. For paper and cardboard enquire of Cama Norton & Co, Hamji Street, Elphinstone Circle, Fort. Bombay ; H. C. Mehta & Bros., Samuel Street, Vadagadi, Bombay ; Bhola N. Dutt & Sons, 134, Old China Bazar Street, and Ghosh Brothers, 63J, Radha Bazar Street ; last two of Calcutta. Perfumes are imported by Sikri & Co., 55-8, Canning Street and B. K. Paul & Co., 1-3, Bonfield's Lane ; both of Calcutta. For engraver's tools enquire of A. J. Soor & Co., Baghbazar, Calcutta. For lead capsules enquire of B. K. Paul & Co., 1-3, Bonfield's Lane, and Satya Charan Pal & Co., 194, Old Chinabazar Street ; both of Calcutta.

1327 D. U. M., Surat. Bear's cigarettes are imported by Abdul Samad & Co., 47, Canning Street, Calcutta. Swedish matches may be had of Lal Chand Brothers, Match Depot, 33A, Central Avenue, Calcutta.

SETT DEY & CO

ORIGINAL HOMOEO PHARMACISTS
42, Strand Road, Calcutta.
Dealers in Boericke and Tafels.
Originals MACHINE MADE Dilutions.
CATALOGUE FREE ON APPLICATION.

1329 M. A. K., Nanded. Formula of glycerine and lime juice cream appeared in August 1921 issue.

1330 T. D. R. B., Colombo. For potato write to Abdul Rahman Saih, 73 Lubbai Masjeed Street, Bangalore and coffee may, be supplied by Mysore Estates & Produce Co., South Parade Bangalore. For hessians enquire of Messrs Moran & Co., Mangoe Lane, Calcutta.

1332 J. N. J., Almora. Boil together caustic soda 1 part, rosin 3 parts; gypsum 3 parts, and water 5 parts. The cement made in this way hardens in about half an hour, hence it must be applied quickly. During the preparation it should be stirred constantly; care should be taken that all the ingredients used must be in a finely powdered state. Apply this cement to the glass lamps. For Indian films write to Pathe Cinema Ltd, Pathe Building, Ballard Estate, Bombay.

1335 D. J. P., Bombay. Export and Import Review published by Auslandverlag G. m. b. H., Krausenstrasse 38-39, Berlin S. W. 19 and Ubersee Post, 10 Solomonstrasse, Leipzig, both of Germany may serve your purpose. We cannot hazard our opinion as to superiority of certain firm. Perfumes of triple extracts refer to essences obtained by extracting thrice—one after another, while floral oil denotes oils whose scents have been deduced from some flowers, such as bela oil, chameli oil, etc. The required address is not known to us.

1336 T. R. C, Secunderabad. Coaltar may be had of D. K. Dey & Co., 39, Clive Street ; Dutt Bros & Co., 38, Clive Street and Gopal Chandra Dass & Co, 94-1, Clive Street ; all of Calcutta. Rosin may be had of Bansidhar Dutta, 126, Khengrapatty, Bara Bazar, Calcutta

1340 K. T. C., Bombay. Pumps for drawing out air may be had of Scientific Apparatus Supplies Co., 29, College Street Market, Calcutta.

1342 A. T. K., Andheri. Glass bottles may be had of Oomer Moosa, Modi Street and A. Parikh & Co., 187, Hornby Road ; both of Bombay. Chemicals may be bought of The Eastern Chemical Co. Ltd., 15, Doughall Road, Ballard Estate, Bombay. Formula of hair oils appeared in January 1921 issue. Please write what particular formula you want. Regarding match manufacture you may write to Mr. A. P. Ghosh, 42, Beniapukur Road, Calcutta.

1344 T. S. R., Meerut City. Wants to buy turmeric of Masulipatam, Madras, Bengal and deshi varieties. Wishes to be put in touch with dealers in lungi in Cuddalore and Melapalayam in Tinnevelly Dist.

1345 B. H. R., Calcutta. Envelope making may prove profitable to you. Envelope making machines may be had of Oriental Machinery Supply Agency Ltd, 20-1, Lal Bazar Street, Calcutta.

1349 S. V., Conjeeveram. For Hattersley loom enquire of Messrs H. M. Mehta & Co., 43, Forbes Street, Fort, Bombay.

1350 V. G. P, Kumbakonam. For particulars regarding machines you may write to Calcutta Industries Ltd. 72, Canning Street, Calcutta.

1352 K. T. J., Rohri. Watches are manufactured by Mare Tovre & Co., Bienne ; Jura Watch Co., Delemont ; both of Switzerland. Watch accessory may be supplied by S. A. Sauser, Soleur and Donzelot and Cie, Porventary ; both of Switzerland. For photo enlargement you may write to Actien Gesellschaft fur Anilin Fabrikaton, Berlin S. O., 36, Jordanstrasse, 1, Germany.

1357 S. M., Sangli. There are generally two kinds of soap, viz., toilet and washing; so please let us know what kind of soap you intend to manufacture. Formula of washing soap appeared in October 1923 issue of INDUSTRY.

General Order Supplying Nursery

The best house for placing orders. If you
are in need of anything, please to
book your order with
DATTA, BOSE & CO.,
23 Ram Rattan Bose Lane Calcutta.

1358 C. L. B., Jodhpur. A graduate having knowledge in accountancy wants to secure an apprenticeship in some commercial or industrial firm.

1359 P. S., Lahore. Please refer your query to the Educational Secretary of your province

1361 S. H. L., Cambellpur. Your query is outside the scope of INDUSTRY.

1362 J. Z. B., Gwalior. Magnesium chloride is a deliquescent salt, very soluble in water. On being heated this salt is decomposed, with evolution of hydrochloric acid and water, leaving behind a residue of magnesia. If the salt be first mixed with ammonium chloride prior to ingition and then carefully raised to a red heat it fuses to a clear liquid, which acquires a crystalline structure on cooling. This body is the salt in its anhydrous form. Magnesia chloride is employed in the preparation of cotton goods. Sodium sulphate was formerly used in medicine as purgative, being known as Glauber's salt.

1363 A. D. P., Poona City. There is no depilatory known that will remove hair for ever. Formula for hair curling lotion appeared in September 1921 issue. Formula of odourless depilatory will be found in the last June issue By using toilet creams complexion is improved but is not totally changed. Formula of snow cream appeared in the last issue.

1364 V. A. P., Poona City. To communicate with any querist address him by number and initials under care of INDUSTRY when your letters will be duly redirected The following technical journals may serve your purpose: (1) Scientific American, New York, U. S. A. (2) Popular Mechanic's Magazine, Chicago, U. S A.; (3) Der Spinner and Weber, Leipzig, Germany and (4) Kurzwaren Industries, Berlin, Germany.

1365 S. V. G., Vizagapatam. You may use blotting paper in filtering coconut oil. Process of preparing castor oil appeared in January, 1924 issue.

1367 K. N. S., Agra. Names of foreign periodicals and journals appeared several times in these column. You may find some in this issue also. Remington Typewriter Co., 3-1, Council House Street and Yost Typewriter Co. Ltd., 12, Dalhousie Square both of Calcutta are the representatives of foreign manufacturers of typewriters—first of U. S. A. and the second of Great Britain. Messrs Singh Sircar & Co, 126, Harrison Road, Calcutta are importers of German goods including novelties, toys and office stationeries. Toys of all sorts may be had of K. B. Nan & Sons, 133, Old China Bazar Street and The Pioneer Toy Mart, 134, Old China Bazar Street; both of Calcutta.

1368 M. B. T., Hyderabad. No such firm is known to us.

1370 P. N. S., Hole Narsipur. For yarn of all sorts enquire of Japan Cotton Trading Co. Ltd., Carlton Bldg., Outram and Khan and Khan, 10, Meadows Street, Fort; both of Bombay.

1377 S. X. C., Bombay. Picture post card may be supplied by City Post Card Co., 42, Mansell Street, London E. 1.; Philco Publishing Co, 4, Holborn Place, London W. C. 1; Photochemic G. m. b. H, N Stolpischestrasse 37 and Kreslawsky Max, S. 6 Wusterhausenerstrasse 16; last two of Berlin, Germany.

1378 S. P. W., Kanauj. Rumour regarding recruitment of Indian labours by Japanese Government is without foundation.

1379 L. A., Harda. Pearlash may be had of Messrs B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta. Enameling brass utensils are carried on a large scale in Jaipur, Moradabad and Kashmir. Hence to learn the art try to be an apprentice in some firm.

Limitation of Family

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357 Pages Price Rs. 4 Postage Extra.

A comprehensive and Confidential Treatise. Every parent desiring to regulate the number of children according to his health and means will find it a god-send, ask for table of detailed contents which will be sent free. K. M. DAS & CO.

29-1, Telepara, Sampooker St, Calcutta.

1381 K. N., Pilibhit. The following are the full addresses of the journals you require : (1) Industrial South Africa, South African Publishers Ltd, P. O. Box 667, Cape Town ; (2) International Banking and Commerce, International Banker Publishing Co, Los Angelos, U. S. A ; (3) Far Eastern Review, 5, Jinkee Road, Sanghai, China ; (4) Norwegian Trade Review published by The Trade Intelligence Bureau of Norway, Christiania, Norway ; (5) The World's Market published by R. G. Dun & Co, The Mercantile Agency, 290, Broadway, New York, U. S. A. ; (6) Ubersee Post, 10, Solomonstrasse, Leipzig, Germany and (7) Export and Import Review, 38-39, Krausenstrasse, Berlin, Germany. Tariff duty is varied according to description of articles imported.

1382 M. C., Peshawar. Corks may be had of P. S. Dutt & Bros, 8, Ezra Street, Calcutta. For iron and brass wire, etc enquire of Dass & Sons, 41, Strand Road and C. Mukherjee & Co., 98, Clive Street ; both of Calcutta.

1383 H. K., Dasgaon. Of all the provincial languages Hindi is spoken widely throughout the country.

1384 T. C., Ahmedabad. Everything regarding canning has been dealt with in the last April, May and June issues of INDUSTRY. Now if you let us know your difficulties we may try to solve them supplying you with necessary suggestions.

1387 P. S. R., Vizagapatam. Optical goods may be supplied by London Optical Co., 344-354, Gray's Inn Road, London W. C. 1 ; Raphael's Ltd, Hatton Garden, London E. C. 1. ; Dupaul Young Optical Co., Southbridge Massachusetts, U S. A. ; Stevens & Co Inc. Providence, Rhode Island, U.S A. and Asanuma & Company, 16, Honcho, Nichome, Nihonbashi-ku, Tokyo, Japan.

1388 N. A. K., Hyderabad. Your enquiry is outside the scope of INDUSTRY.

1389 S. R. C., Ellore. For match machines and other necessary information write to Ghatak & Co., Rai Bahadur Road, Behala; Bengal Small Industries Co., 91, Durga Charan Mitter Street, and Bhowani Engineering and Trading Co, 122-1, Upper Circular Rd ; all of Calcutta.

1390 S. M. M., Lonavla. The recipe in question refers to fast colour.

1391 A. P., Ambala. For betel nut and catechu enquire of Bansidhar Dutt & Sons, 126, Khengraputty, Barabazar, Calcutta. Formula of white blanco appeared in June 1924 issue.

1393 D. E., Srinagar. Refer to No. 1381.

1394 P. M. M, Rawalpindi. You may correspond with the following photographers, Photo Atelier, 349 Upper Chitpur Road, Calcutta ; Artistic Photographers, 64-4, Beadon Street, Calcutta and Excelsior Studio, Opp Prag Mahal, Kalbadevi Road, Bombay.

1398 S. C. R. J., Marwar. Please consult a physician.

1401 K. B. A, Ballur. It is not possible to give the exact formula of patent articles without analysing them chemically. For flavouring cigarettes the following process may be recommended. Take lign santal flav., 1 oz ; cort cinnamonin 1 oz; flor. lavand., 2 oz; caryophylli [illegible] oz ; mix with tobacco. For industrial books enquire of Messrs. Chakraverty Chatterjee & Co., Ltd, 15, College Sq, Calcutta. In preparing syrup powder saccharine is generally used for sugar. Loaf sugar is refined sugar and crushed sugar, as the very name implies,

QUITE FREE.

Sample & Price list
of the most popular
MONKEY BRAND BLACK
TOOTH POWDER
for all Dental Diseases.
Apply to—
NOGI & CO., Bombay No. 4.

refers to sugar powdered. During the rainy season place the syrup powder in some dry place. Your other queries will be treated in an early issue of INDUSTRY.

1402 R. N. M., Meerut. For learning block making try to be an apprentice in some block making concern. In this connection you may write to Mahila Press, 29, Pataldanga Lane, Calcutta. You may also go through February 1923 issue of INDUSTRY wherein you will find an elaborate article on the subject.

1403 V. S. C. W., Agra. Requires services of a match expert who may help him in match manufacture. In the meantime you may write to Mr. A. P. Ghosh, 42, Beniapukur Road, Entally, Calcutta for expert advice. There is perhaps no book on match manufacture which will be up to your requirements.

1404 H. R., Rewari. It is not possible to measure temperature without the help of thermometer. Try to open the bottle with a cork screw but very slowly.

1405 K. H. D., Hyderabad. A formula of printing photo on ceramics will appear in an early issue. For curing writers' cramp seek medical advice. Women generally paint their cheeks with rouge. Immerse the shoe leather in lard or tallow for softening. Vacuum cleaner is used for cleaning carpets. These are available in the market. In cleaning brushes soap solution may be used. Formulas of retouching faded photographs and chrome transfer prints will appear in early issue of INDUSTRY.

Kaminia - -
Oil.
Used by all nations for preserving and beutifying the hair & keeping the head cool & brain refreshed. Rs. 1-4 per bottle.
(Registered)-
TRY IT ONCE.
Sold Everywhere.

In polishing nickel-plated articles use metal polish. It is not possible to prevent shrinkage of cork. Gum arabic is a natural product. Apply soda ash in washing uncleaned bottles. Old oil-cloths cannot be repaired. You may consult the medical journal "Lancet", London. All the other formulas appeared in the last two volumes of INDUSTRY.

1406 K. C. R. C., Barisha. For preserving fruits you are referred to the series of article on canning which appeared in April, May and June, 1924 issues of INDUSTRY.

1407 B. L. G, Nainital. For expert weavers you may write, to the Principal, Govt. Weaving Institute, Serampore, Howrah For peeling system match machine write to Bengal Small Industries Co., 91 Durga Charan Mitter Street and Ghatak & Co, Rai Bahadur Road, Behala ; both of Calcutta.

1409 P. B. C., Porbandar. Formula of black ink appeared in June 1924 issue of INDUSTRY. A good recipe of blue black ink will be found in September 1923 issue. An article on boot polish appeared in June 1923 issue.

1410 L. R. W., Sutna. You may correspond direct with the Consul-General for Japan, 7, Loudon Street, Calcutta.

1413 Z R. G., Indore. Toys may be supplied by Ake & Co, 61, Nichome, Noge-machi, Yokohama, Japan ; Amano & Co., 313, Nichome, Sonnomiya-cho, Kobe, Japan ; Bisse & Ullmann, Nurnberg, Kasserstrasse 20-22 and I. Hasselbacher & Co, Nurnberg, Ludevig Fenerbachstrasse 67 ; last two of Germany. For hosiery enquire of Horikawa Shoten Ltd, 10 Nichome Hancho, Nihonbashi-ku, Tokyo, Japan ; Imanaga & Co, 2 Chome, Tsurigane-cho, Higashiku, Osaka, Japan ; Wishelm Morgenstern, Marienberg U. S. A. and Alfred Kulick, Chemnitz 20 E. Saxony ; last two of Germany. Cutlery articles may be supplied by Hugo Linder's Deltawerk, Solingen and J. H. Becker Inc, Solingen 19 ; both of Germany.

1414 R. S. M., Pudhuvayil. It is not possible to deodorise onion juice. Menthol is generally used as pain-killer in rheumatism. Dissolve camphor in turpentine oil and continue doing this till camphor no longer dissolves in turpentine. Formula of tooth paste appeared in August 1922 issue.

1415 V. D., Goa. Home printing machines may be had of K. Banerjee, 133, Canning Street and S. C. Dutt & B. K. Dutt, 100, Durga Charan Mitter Street ; both of Calcutta.

1416 Q. N. H., Daltonganj. Tobacco for *biris* may be had of Moolji Sicka & Co , 51, Ezra Street, Calcutta.

1418 D. R., Pilibbit. The Worlds Market is published by Messrs. R. G. Dun & Co., The Mercantile Agency, 290 Broadway, New York, U. S. A. Refer to No. 1381.

1419 S. K., Rajgram. To dispose of the articles you deal in advertise in some widely circulated papers.

1420 S. C., Madras. All the addresses you require will be found in Kelly's World Directory.

1422 K. U. R R., Bapatla. Desires to know the address of South Indian Export brand match manufacturers

1423 P. G., Tenali. For amber write to Mr. S. N. De, P. O. Box 7851, Calcutta.

1425 J. N., Rawalpindi. Please write definitely what particular addresses you want and what particular articles you want to manufacture. Otherwise it is very difficult on our part to comply with your request.

1426 M. A. C., Moradabad. Elephant brand cigarettes are manufactured by Thomas Bear & Sons Ltd., London.

1427 . P. C. S., Jalpaiguri. Instruments you require may be had of Bengal Scientific Supplies Co, 29, College St. Market, Calcutta. Soap making apparatuses may be had of Calcutta Industries Ltd., 71, Canning Street, Calcutta.

1428 M. P. K , Kuranur. Aluminium sheets may be bought of Balmer Lawrie & Co., 103, Clive Street and William Jacks & Co., D 2 Clive Bldgs, 8 Clive Street ; both of Calcutta.

1429 S. A. A. S., Rangoon. Dissolve the caustic soda in double its weight of water and add this to the coconut oil in a boiling pan. Add the remaining water and boil for several minutes when saponification takes place. As the mixture thickens, the silicate and soda crystals are added as filling agents. The temperature should not exceed 60°C and it is stirred vigorously. Dry salt is then scattered over the surface and mixed immediately. The soap is now ready to be moulded into frames. The product will be washing soda as stated in August 1923 issue.

1431 A. S. D., Karachi. Wants to know the complete address of Premier Institute of Naturopathy, Nellore. For the other query you are referred to League of Nations, Geneva, Switzerland.

1432 N. T. M., Karachi. For match making machines you may write to Messrs. Ghatak & Co, Rai Bahadur Road, Behala ; Bhawani Engineering & Trading Co., 122-1, Upper Circular Road and Bengal Small Industries Co , 91, Durga Charan Mitter Street ; all of Calcutta. For soap making apparatuses you may enquire of L. B. Verma, Cawnpore. For expert advice on match manufacture you may write to Mr. A P. Ghosh, 42, Beniapukur Road, Entally, Calcutta. For soap making you may consult Art of Soap Making by Watt.

1433 D. R. C., Bettiah Woollen thread may be had of E B. Bros & Co., 11, Dharamtala Street, Calcutta. For selling the articles manufactured by you advertise widely.

The Ideal Cooker
FOR THE HOME
New manufactures cheaper prices & larger output are our aims.
Illustrated Catalogue free.
Annapurna Cooker Co.
No. 1 A P O Thalakwadi,
Belgaum, M S M.Ry.

1439 S. I. M. G , Surat. You may write to Secretary, Students Advisory Bureau, Presidency College, College Street, Calcutta.

1442 M. L. S., Nasirabad. Formula of laundry soap appeared in May 1924 issue. Soap stone or kaolin may be used as filling agent in soap. For analysis you may write to Hughe and Davis, Stock Exchange Bldgs, 130, Medows Street, Fort, Bombay. Chemicals may be had of Industrial Chemical Works, Govt. Gate Road, Parel, Bombay and The Eastern Chemical Co. Ltd. 15 Dougall Road, Ballard Estate, Bombay. One hydrometer can measure the density of all kinds of liquid. Recipe of hypophosphate of lime appeared in June 1922 issue of INDUSTRY. For colour and scents used in soap you may write to Messrs Sikri & Co., 55-8, Canning Street, Calcutta.

1443 R. U. A., Bhopal. A gas lighter than air should be made use of in filling rubber baloons. Hydrogen being the lightest gas and available with ease at the same time is mostly employed for the purpose. It may be prepared in a wide-mouthed bottle by the action of sulphuric acid on commercial zinc. For further details on the methods of operation a text book of chemistry may be consulted.

1445 K. R , Lahore. Tablet making machines may be bought of Calcutta Industries Ltd, 71, Canning Street, Calcutta. For other portion consult a directory.

1446 R. U., Gudivada. Mantles are manufactured by K. S. Kihal, Raigarh, C. P.

1447 V. S. S., Jaipur. For the required machine enquire of Oriental Machinery Supply Agency Ltd, 20-1, Lall Bazar Street, Calcutta who will supply you the required information.

1449 N. L , Golmuri. Your query is engaging our attention.

1451 A. L. K., Banosa. Formula for making washing soap like sun light soap appeared in August 1921 issue. It is very difficult to suggest how much caustic soda will be required in preparing washing soap without taking any particular formula. For formula of washing soap you are referred to May 1924 issue.

1453 M. K. K., Madras. For information regarding match machines please enquire of Association of Indian Match Manufacturers, 122-1, Upper Circular Road, Calcutta. To prepare potassium chlorate chlorine gas is led into hot milk of lime, and the difficultly crystallisable calcium chlorate thus produced is converted into potassium or sodium chlorate by adding excess of potassium chloride. Formula of red phosphorus appears elsewhere in this issue.

1455 D. V. B., Hyderabad. For the rules and regulations of The International Sample Fair at Leipzig write to the Secretary of the Exhibition, Leipzig, Germany.

1456 K. C. C , Dharwar. Formula of tooth powder appeared in June 1922 issue. Brass and silver articles may be gilded to shine like gold. Process of gilding by dipping appeared in April 1923 issue. Gray hairs cannot be turned black permanently. For timely change you may use hair dye the formula of which appeared in June, 1923 issue.

1457 G. S. C , Poona City. Fountain pens may be had of The Sun Co, Tanjore. Safety razors may be had of Brain & Co, Ludhiana, Punjab.

1460 A. A. Q., Rawalpindi. Blocks are made by U. Ray & Sons. Garpar Road and Bharatvarsa Halftone Works, 201 Cornwallis Street ; both of Calcutta. For journals on cinema film enquire of Fox Photoplay Institute, 30, M. Michigan Avenue, Chicago, U S.A.

1462 M. A. G , Gurgaon. A series of articles on sugar manufacture appeared in 11th volume of INDUSTRY where you will find everything you require. You may go through Bulletin No. 19. about Improvement on Native Methods of Sugar Manufacture by S. M. Hadi to be had of Superintendent Govt. Printing U. P., Allahabad, price 2 as.

1463 B. R. M., Farrukhabad. Newar making machines may be supplied by Oriental Machinery Supply Agency Ltd., 20-1, Lal Bazar Street, Calcutta. The required address is not known to us.

1464 B. N. H. C., Aligarh. To dispose of your metal advertise widely.

1465 K. N., Imphal. For the uses of bear's fat consult *hakims*. For exchanging gramophone records write to the firm from where you bought those.

1466 R. D. L , Agra. Your enquiry appeared in July 1924 issue

1467 C. L. S., Porbander. The toys you referred to are made of bees-wax. For toys enquire of K. B. Nan, 133, Old China Bazar Street, Calcutta.

1470 M. V. P., Poona City. Books may be had of Andhra Publishing House, P O. Box 73 and Causce Chetty & Son, Park Town ; both of Madras.

1471 B. B L. K L.., Ambala City. Formula of fountain pen ink appears elsewhere in this issue.

1472 A. A. G. A , Shikarpur. You may consult Lancet, London.

1474 No Name, Pilibhit. You may consult The Newspaper Press Directory published by C. Mitchell & Co. Ltd., Mitchell House, 1 & 2 Snow Hill, Holborn Viaduct, London E. C. 1.

1477 K. C. V , Bijnor. Formula of silvering glass appeared in March 1923 issue.

1478 K. S A , Kalyana Singapur. Gramophones may be had of S. N. Bhattacharji, 5, Dharamtollah Street, Calcutta ; Gramophone Co., Ltd, 139, Beliaghatta Road, Calcutta and Talking Machine and Indian Record Co., 70, Apollo Street, Bombay.

1480 I. B. B , Serampore. There is no school in India where sugar making is taught. Try to secure an apprenticeship in some sugar factory. For information regarding sugar manufacture write to Java Sugar Trust, pla Algemeene Syndicaat voor Java Suiker Fabrikanten, Heerenstraat Sourabaya, Java.

1482 H. N. S., Almora. For bee keeping instruments and accessories enquire of E. Plomer & Co., Simla and T. J. Baldwin, The Apiary, Bromley, Kent, Eng. And for other information enquire of British Beekeepers' Association, 23, Bedford Street, Strand, London.

1483 M. T. A., Beliatta. Cameras may be supplied by Ansco Co, Binghamton, New York and Eastman Kodak Co., of New Jersey, Rochester, New York ; both of U. S. A.

1484 S. G. P., Homalin. For the spices enquire of Banshidhar Dutta, 26, Khengraputty, Barabazar, Calcutta. Essential oils may be had of P. Mukherjee, 28-29, College Street Market, Calcutta.

1485 S. N., Punalur. For bleaching of woods used in match making please go through September 1923 issue of INDUSTRY.

1489 S. S. S , Asrapur. The vernaculars for Turpeth root or Indian Jalap are Nisoth, teori, chita bansa, turbund, tavada, shivadai.

1490 J. M., Nankana Sahib. For pumps write to (1) Jessop & Co., 93, Clive Street, (2) Goldberg Brothers, 21, Middle Road, Entally, (3) Heatly and Gresham 6, Waterloo Street ; all of Calcutta.

1491 M. P. S., Agra. Formula of hair dye appeared in June 1924 issue. Process of preparing tea tablet will be found in July 1923 issue. It is not possible to remove the bitter effect of saccharine. Wants to buy back copies of INDUSTRY.

Weigh Yourself

ওজন

After using **Amrita Kundu Salsa with Gold** for only 2 weeks, you will find that your weight has much increased It **Purifies the blood**, and increases and strengthens the growth of blood by creating blood corpuscle. It destroys the **mercurial & syphilitic poison.** Price 1 phial Re 1. Postage 8 as 3 phial Rs. 2-8. Postage 15 as Catalogue free on application.

Kaviraj Dashorothy Kaviratna,
Dawn Lane, Hatkhola Post, Calcutta.

1492 R. L., Pilibhit. Chemicals may be bought of Calcutta Chemical Co. Ltd. 35-1 Panditia Road, Ballvgunge; B. K. Paul & Co., 1-3 Bonfield's Lane, and Bengal Chemical & Pharmaceutical Works Ltd., 15 College Square; all of Calcutta. Import duty for German goods are the same as that for English or American goods. Match machines may be supplied by A. Roller, Prinzen Allee 24, Berlin N 20, Germany. Picture post cards may be supplied by P. Racine & Cie, Boul Sebastopole 96, Paris, France and Novitas Verlag, 6 Kellner Ritterstrasse 77-78, Berlin S. W. Germany. Refer to 1474.

1493. B. B. L., Ambala City. Process of charging dry batteries appeared in June 1923 issue. Formula of python egg will appear in the next issue. For fireworks write to Orient Fire Works, 85-1 Upper Circular Road, Calcutta. Radium is a rare and valuable natural product which cannot be prepared chemically. For fountain pen nibs enquire of Nilmony Halder & Sons, 106, Radhabazar Street, Calcutta. Talking machines may be supplied by Thomas A. Edison Inc, Orange, New Jersev and General Phonograph Corp., New York; both of U. S. A.

1494 M. G. A., Ambala City. Recipe of syrup hypophosphate of lime appeared in June 1922 issue. Betelnut and catechu may be bought of Bansidhar Dutt, 126, Khengraputty, Barabazar, Calcutta. Process of tinning brass and copper will appear in an early issue.

1495 F., Multan City. Please consult Thacker's Indian Directory.

1497 P. S. J. C., Agra. Almond oil may be replaced by groundnut oil. For hair oils please go through 'Hair Oil Manufacture' published by INDUSTRY Office, Shambazar, Calcutta.

1498 C. N. R, Jangaon. Desires to buy Therory Fuel Stones for pocket. Process of refilling dry batteries appeared in June 1923 issue. Homoeopathic mother tinctures are not manufactured in India.

1499 P. B. B., Pabna. Rice hullers may be had of Messrs Marshall Sons & Co. Ltd., 99, Clive Street and Ghatak & Co., Rai Bahadur Road, Behala; both of Calcutta.

1500 H. Y. B., Moradabad. Aluminium wares may be had of Govardhan dass Manicklal, 69-3, Canning Street; Jeewanlal & Co., 55, Canning Street; both of Calcutta. Spectacles may be supplied by Lawrence & Mayo, 16, Old Court House Street, Calcutta. For sporting goods enquire of Chandri & Co.: and D. D. Ghulam Nabi & Co., Sialkot City, Punjab. Watch accessories may be had of Anglo-Swiss Watch Co., 6 & 7, Dalhousie Square and Esoofally Hiptolla & Co., 10, Radha Bazar Street; both of Calcutta. For otto enquire of Sikri & Co., 55-8, Canning Street, Calcutta.

1501 C. L. T., Pilibhit. Gallotannic ink is the best and is not wiped away when washed with water. Melt 10 parts of lard, 1 part of wax and mix with a sufficient quantity of lamp black. Saturate unglazed paper with this, remove excess and press. The product will be an excellent kind of carbon paper Almost all the provinces of India have library attacthed to their industries departments. Stationery articles used in drawing may be had of Indian School Supplv Depot, 309, Bowbazar Street; W. Newman & Co. Ltd., 4, Dalhousie Square and Indian Pioneers Co. Ltd., 18, Shama Charan De Street, College Square; all of Calcutta. Electric lamps may be bought of Mc. Lawrie & Co., 7 Ezra Street and Equitable Trading Co., 123, Canning Street; both of Calcutta. You may consult The Art of Soap Making by Watt and Ink by Mitchel.

Free! Free!! Free!!!

Onlv to the first 1000 readers of INDUSTRY, I send by free post and gratis full prospectus and particulars of the new and marvellous Correspondence Lessons on Riches. Apply enclosing one anna stamp to

R. SESHAN, Editor,
1046, E. A. Street, Srirangam P.O., Trichinopoly.

1502. B. C. A., Baradand. You may write to the company whether they have got any agency in India. You may also direct the importing firms such as Oriental Machinery Supply Agency Ltd., 20-1, Lall Bazar Street, Calcutta to import the required machinery on your behalf.

1504 H. N., Cawnpore. You may correspond, with Jogendra Chandra Dass & Co., 54, Canning Street, Calcutta for grain and pulses.

1506 K. N., Coimbatore. Process of removing ink stain appears elsewhere in this issue. Place gold threads overnight in wine and then mangle them smooth between 2 clean cloths and then hang them up to dry. Colour and gloss are restored by heating in a pot 1 pint each of water and whiskey, to which has been added pulverized gum arabic and some saffron; spread the thread upon a table and apply the solution uniformly with a small brush and then hang them up to dry.

1508 S. L. G., Rangoon. For oil mills and information regarding them write to Messrs Burn & Co., 7, Hastings Street, Calcutta and Jessop & Co. Ltd., 93, Clive Street, Calcutta. For the required books enquire of Chackravertty Chatterjee & Co. Ltd, 15, College Square, Calcutta.

1509 M. J. G., Therdam. For sugar manufacture you may go through Bulletin No. 19 on Improvement on the Native Methods of Sugar Manufacture by Mr. S. M. Hadi to be had of Government Printing, U. P., Allahabad, price 2 annas.

1510 J. M. R., Rajshahi. Process of making citric acid from lemon appeared in June 1924 issue and formula of lemon oil will be found in June 1922 issue. Lemon oil and citric acid are imported by B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta. Can supply tortoise shell.

1514 M. R. R., Hyderabad. Pusa Agricultural College, Pusa, Bihar and Poona Agricultural College, Poona are the leading agricultural institutions in India. You may consult Indian Agricultural Journal to be had of Thacker Spink & Co., 3, Esplanade East, Calcutta. American seeds may be supplied by W. Atlee Burpee & Co., Philadelphia, Pennsylvania. Agricultural implements may be supplied by Bucher & Gibbes Plow Co., Canton, Ohio; International Harvester Corp, Chicago, Illinois and South Bend Chilled Plow Co., Batavia, New York; all of U.S.A.

1516 R. S. M., Allahabad. Please let us know how far you have succeeded and where is your difficulty in detail; otherwise it is not possible to suggest hints for improvements of the hair dye manufactured by you.

1517 H. G. A., Kambanato. For looms equire of Bros. Partner & Co., 35, Ezra Street, Calcutta.

1518 S. R. R. C., Dindigul. German directory may be had of Consul-General for Germany, 2, Store Road, Ballygunge, Calcutta.

1519 R. S., Lashkar. If the production turns out to be good there would be buyers for these articles and many would be eager to take agency thereof. To secure agents for the boot and shoe laces you manufacture write to boot and shoe merchants of Bombay and Calcutta enclosing samples for inspection.

1521 D. D. T. T., Lansdowne. To communicate with any querist address him by number and initials under care of INDUSTRY when your letters will be duly redirected.

Cheapest House for

Sporting Goods

Silver Medals, cups & Shields.

Fine Silver Medals in Velvet lined cases.

Rs. 3-12 Each.
Largest Stock & Variety.
Illustrated Lists Free

Carr & Mahalanobis,
CHOWRINGHEE CORNER, CALCUTTA.

1523 D. P. G., Anjar. The dimensions of the compartment of the trough may be adopted to your requirements. The trough is completely covered over and there are two flues in the two brine compartments serving as outlets for chlorine which is subsequently passed into bleaching powder chamber. To quote Mr. W. Gordan Carey, 144 cells of the rocking Castner type, measuring 6 ft. and by 4 ft. internally and containing 200 lbs. of mercury, gave with a current of 560 amperes at 4 volts per cell about 0·75 gallons of 20 per cent. caustic soda per hour. The evolved chlorine made 40 tons of bleaching powder per week. There is no need for maintaining a particular specific gravity for brine. The solution must be strong and more and more salt should be added as the rate of generating chlorine diminishes gradually.

1527 M. M. M.. Itinda. Printing machines may be had of K. Banerjee, 133, Canning Street and Indo-Swiss Trading Co., 27, Pollock Street ; both of Calcutta.

1530 C. J., Manwar Pali. Cream separators may be had of P. Lodge & Co., Post Box 6772, Calcutta.

1531 A. H. M., Fatehgarh. Knitting machines may be had of Economic Hosiery Mills Ltd., 20-1, Lall Bazar Street, Calcutta.

1532 B. S, Balangir. Photography is taught in Fox Photoplay Institute, 30N, Michigan Avenue, Chicago, U. S. A. For prospectus you may write to the School of Dentisty, 26A, South Parade, Bangalore and The Calcutta Dental College & Hospital, 12-1, Esplanade East, Calcutta.

1534 H. S.. Bahraich. You may use carbon rod in dry batteries. Formula of carbon rod appeared in November 1920 issue of INDUSTRY.

1535 P. C. G., Patna. Wants to buy scented cards.

1537 E. A. J. R. M. P., Colombo. To secure agency go through Sale and Exchange columns of INDUSTRY. You may also insert an advertisement in these pages.

1538 S. B., Calcutta. Your enquiry being in the nature of an advertisement should not be dealt with in these columns.

1541 H. A. K., Murree. Formula of acetic acid appeared in January 1922 issue.

1543 M. N., Castle Rock. For analysis and indentification of the clays please consult Mr. R. V. Briggs, 8, Lal Bazar Street, Calcutta. It the white clay be china clay it may be put to a number of industrial uses. If the yellow clay be ochre it may be used in paint manufacture. Try slate pencils from the black clay.

1544 G. G., Nagpur. For further studies in foreign countries write to the Association for the Advancement of Scientific Studies of Indian Students in Foreign Countries, 10, Old Post Office Street, Calcutta. There is no electrical engineering school in India known to us where private candidates are allowed to appear in the examination. You may write to Superintendent, Commissioners of Port, Engineering Dept., Strand Road, Calcutta.

1545 D. N. B.. Multan. You may refer your enquiry to the Principal, Bengal Engineering College, Shibpur, Howrah.

1546 P. L. B., Bombay. Your enquiry is outside the scope of INDUSTRY Please consult a physician.

Bombay Deshi Oushadhalaya.
Factory and Dispensary.
ASK FOR ANY FEVER
AGUE KILLER.
1 Phial As. 8. Doz. Rs. 5.
and our other popular remedies. Can be had everywhere at Cheapest Rate.
PEARL & CO.,
Victoria Garden, Bombay.

Notices and Reviews.

Headache Wafers.

Messrs Ramchand Teckchand & Co. Advani Lane, Hyderabad, Sind are manufacturers of headache wafers which are claimed to cure headaches by simply dissolving them in water and drinking the same.

Asafoetida.

We greatly appreciate the samples of different kinds of asafoetida which we have received from Himalaya Stores, Kasauli Hills, Punjab. Their quality is of high grade while their prices are moderate. To obtain the pure stuff the readers should try this firm.

Soap.

Highly scented toilet soaps guaranteed to be free from tallow are manufactured by the Lily Soap Factory. These are made in different kinds and may be had of the managing agents Messrs A. Gnanasundram Chetty & Co., No. 40 Kalathee Pillay St., Elephant Gate, Madras.

"Unique Slate."

This is a novel paper-saving device made locally from indigenous ingredients. No ink, pen or pencil is required to use it and its cost is trifling. It may be had of Messrs. Balkrishna Mohta & Co, 41, Khetra Mittra Lane, Salkia, Howrah.

Swadeshi Bazar.

An Exhibition and Bazar of Swadeshi Goods is going to be held at Poona during the ensuing Ganapati Festivals, i. e., from the 2nd September 1924 onwards. The organizers have therefore to request all Indian manufacturers to co-operate in order that the function may be a splendid success. For further particulars they should apply to the Tilak Mahavidyalaya Udyogabhavan Exhibition Office, Poona City.

The Journal of Ayurveda.

Edited by Mahamohapadhaya Kaviraj Gananath Sen, Saraswati, M.A., L.M.S. Office: 2, Horokumar Tagore Square, Calcutta. Annual subscription Rs. 10 only.

We welcome the appearance of the above journal devoted to the study of the system of therapeutics; the first one of its kind to be conducted on the model of Western medical journals. Objects of this journal are to bridge the gulf between Ayurveda and Western medical science; to bring home to the Ayurvedic physicians the necessity of keeping pace with modern progress in medicine and surgery and to spread the knowledge of Ayurveda. The Journal will therefore be read with great interest and profit not only by the Kavirajas but also by all other medical practitioners in India, whose thanks are due to Kaviraj A. C Bisharad for its inauguration. We wish the journal godspeed.

Notice.

We regret to note that a few of our readers occasionally send us New Idea Suggestions which are either a copy or a summary of certain ideas suggested previously by some other subscribers. On the one hand the preceding contributors are sought to be deprived of the fruits of their honest labour and on the other the writers commit themselves to serious offence. We therefore warn all our readers not to send any suggestions for new ideas unless they be original.

Questions of all kinds falling within the scope of INDUSTRY are invited from our readers. Enquiries or reply from our experts will be published free of charge. Questions are not generally replied by post but when urgent replies are required, four annas stamp should be enclosed along with the queries to cover stationery and other contingency charges.

Trade Enquiries.

[Letters to the parties are to be addressed by number and initials under care of INDUSTRY when these will be duly redirected]

1149 C. K. Bros., Pallikunnu. Desire to be put in touch with dealers in waterproof paper and cloth for packing purposes.

1261 M. A., Nagina. Requires services of a chemist expert in producing damp-proof matches.

1369 M. G. D. &Co., Mhow. Require 10 mds washing soda per month preferably from Bombay side.

1371 M. D., Simla. Can supply bottles and phials and wants to be put in touch with suppliers of piece-goods labels.

1376 B. V. R. & Co., Ellore. Can supply groundnut cakes, white clay and all kinds of ochres.

1392 P. S. S., Tindivanam. Desires to be an agent of a groundnut oil dealer.

1400 N. K. J., Almora. Can supply crude borax and raw wool.

1436 R. S., Kottar. Wishes to know where he can get Sawath, a Tamil name for a medicinal substance found in some species of cat.

1450 N. K. G., Calcutta. Wants to acquire practical training.

1481 A. P. N., Buniadganj. Wishes to be put iu touch with suppliers of fresh fruits.

1486 A. D., Colombo. Desires to be introduced to manufacturers of embroidered carpets and rugs, window and door curtains, cushion covers, table covers, teapoy covers, sideboard covers, carved folding tables, inlaid ivory folding tables and inlaid brass folding tables.

1496 B. B., Allahabad. Can supply fresh almond oil.

1505 H. B. K., Bombay. Wishes to be put in touch with Kashmiri and Nepalese dealers in coral art and jewellery.

1512 P. N. N., Calcutta. Wants a capitalist to start bell metal industry on a small scale. Rs. 3 to 5 hundred may suffice for start. Good profit expected.

1555 M. D. C., Lalamusa. Can supply Euphorbium.

1565 G. Rai Sharma, Berlin S. W. 11, Mockernstr. 135, Germany. Wants to be put in touch with dealers in Mushadi silk handkerchiefs, etc.

September Issue of Industry.

(*In the Press*)

The September issue of INDUSTRY will be the Dusserah Number dealing specially in Perfumery and Toilet Preparations ; Puja Specialities such as pyrotechny, etc. Besides it will contain technical articles in addition to Formulas, Small Trades, New Ideas and other useful features. Any friend of our subscribers may get a copy free as sample on application to Manager, Industry Shambazar, Calcutta.

INDUSTRY.

Is a monthly Journal of Technology and Handicrafts, Science and Commerce. Agriculture and Business. The rate of subscription is as follows:—

Indian Rs. 3. Foreign Rs. 5-4.

The charge is for complete yearly volume only. inclusive of postage.

Single Copy As. 5 only.

BUSINESS NOTICE.

Industry is published at the end of every month.

Subscribers are enlisted at any time of the year but they will receive only the number from April to March comprising a complete volume for one year's subscription.

At the time of sending a V.P.P. only the current number is generally sent. The previous issues of the volume are sent per book-post on receipt of the value of the V.P.P. For particulars and Advt. rate please write to—

Manager, INDUSTRY OFFICE,
Shambazar, Calcutta.

Managing Editor—Mr B. M. Banerjee.

MANAGING EDITOR - MR. B. M. BANERJEE.

INDUSTRY
A Journal of Technology Handicrafts & Commerce

Vol. XV. *Calcutta, September, 1924* *No. 174*

The Goodwill Season.

THE morning blossom exhales its fragrance which is borne far and wide beyond its immediate surroundings. The perfume is diffused through the air and those who happen to be within its compass are made aware of the presence of the flower—the source of their pleasant perception. The flower exhilerates every one in its neighbourhood, heedless of the traits of the recipient. The early hours of the morning are thus the time of charming freshness and delightful feeling, symbolized in the flower.

The Goodwill Season Dusserah is similar to and comparable with the blooming time in many respects. In this hour of divine bliss felicitations are expressed for and congratulations are sent to all irrespective of caste and creed. Goodwill is mutually exchanged amongst the people. Friends wish well of their acquaintances ; enemies forgive one another ; the high embrace the low; the rich help the poor.

We join in this universal felicity today and send our heartiest greetings to our readers and subscribers and to our friends and critics, wishing them health, wealth and prosperity and praying for peace and plenty on earth. We desire that the cordiality that exists as between ourselves and our readers and as amongst themselves might continue to be productive of noble endeavours. We hope the co-operation that is the watchword of this fraternity be conducive to the welfare of its individual members. We earnestly invoke the blessings of the Almighty that their undertakings might lead to success.

Like the dawn the Dusserah is the period of new hopes and aspirations ; of renewed vigour and determination which are embodied in INDUSTRY. Let, therefore, the pages of INDUSTRY carry its message of goodwill to all even as the perfume of the blossom is purveyed by the gentle breeze and enthuses every one in its path. Let INDUSTRY be the fountain-head of their inspiration for all time.

INDIA'S INDUSTRIAL PROGRESS.

Silks of India.

Bengal and Mysore are the natural silk-producing districts of India, but these provinces fall within the tropics, whereas other portions of the silk-producing belt are north of the tropics. The result is that only a special type of silkworm can be raised, and the thread of the cocoon is finer and consequently more brittle than that of other varieties. Attempts to improve the silkworm by cross-breeding have failed owing to the hot humid climate. The losses from disease assumed a serious form about fifteen years ago, and silkworm raising has become unpopular in Bengal.

Kashmir ranks next in importance in the silk industry of India, and owing to the steps taken to import the best eggs from Europe and Japan and the establishment of a State-owned filature built on modern lines, attractive and well-reeled silk is produced. Madras, the Punjab, Patiala, Burma, and Assam are other cocoon-producing districts, but the production is only on a small scale. The wild silks of India are of interest—the Tussore and Muga silkworms feeding on the leaves of forest trees and the eri worm on the castor-oil plant. The cocoons of the latter are not reelable, and can only be used as silk waste in the spun silk industry.

Indian Cotton.

In their efforts to improve the marketing of Indian cotton the Indian Central Cotton Committee have been directing their attention to the reduction of the abuses which made Indian cotton unpopular. The Cotton Transport Act, which is already in force in the Bombay Presidency, prevents the movement of cotton from one tract to another for the purposes of fraudulent mixing, and as a result of less than one year's work the Bombay cotton trade reported a marked improvement in Surat, Kumpta, and Dharwar cottons. The Committee is particularly desirous of obtaining assistance in the marketing of new types of Indian cottons. The Indian cotton crop is approximately five million bales annually, of which about 1½ million bales is cotton fit for 20's counts, or higher. The Agricultural Departments during the past ten years have added 400,000 bales to the crop of Indian medium staple cottons. If such cottons are to be still further developed it is essential to secure to the grower a really satisfactory premium for improved cotton. The Central Cotton Committee feel that Lancashire does not know the best Indian cottons, and has not had a chance of trying them. For that reason they made the proposal that they should send to Manchester two bales each of six improved cottons now produced on a commercial scale, for spinning trials, This suggestion was accepted, and it is hoped that, as a result of spinning tests, trial orders for these new cottons will be sent out to India. Indian mills absorb about one million bales annully of Indian stapled cottons, leaving about half a million bales for export.

PUJAH SPECIALITIES.

Rockets.

THE simple rocket consists of a tube, open at one end, into which is rammed black powder mixture. A long conical hole is made in the composition, and a piece of quick-match or other igniting device is, applied. The composition burns from the surface of the conical hole outwards, and the products of combustion, largely gaseous, escape at a high velocity through the constricted opening, with the result that the rocket is driven, forwards. For convenience of loading the composition is sometimes compressed into pellets before being placed in the rocket case. The mixtures used vary considerably in composition.

Saltpetre	57—89	per cent.
Charcoal	16—33	,,
Sulphur	9—16	,,

The compositions that burn most quickly are those that do not differ very much from ordinary gun powder. The charcoal is often not powdered very finely in order that a good trail of sparks may be formed as the rocket rises.

The rocket used for pyrotechnic displays has a cardboard case and a chamber in the forward end, separated by a plug of clay or other material through which passes a piece of quick match. The chamber contains gunpowder and a number of stars, composed of white or coloured light composition and primed with mealed powder. When the rocket has reached its maximum height and all the rocket composition has burnt away, ignition is conveyed by the quick-match to the powder, which explodes and bursts the walls of the chamber. The stars then fall down burning brightly.

Coloured Lights.

THOSE who have a good knowledge of the theoretical chemistry know that compounds of copper, sodium, barium and strontium yield blue, yellow, green and red lights respectively. A variety of tinges can be obtained by using other metallic compounds such as those of calcium, potassium, etc. Mixtures of the chlorates of these elements together with sulphur or any sulphide burn with great brilliancy but such compositions are usually attended with dangers.

A few recipes of coloured fire mixtures are given below which must be prepared with care and used much more carefully, ingredients being by parts.

GREEN.

Barium chlorate	66
Milk sugar	33
Shellac	1

YELLOW.

Sodium nitrate	70
Sulphur	20
Antimony sulphide	7
Lampblack	3

RED.

Potassium chlorate	78
Strontium carbonate	15
Shellac	7

BLUE.

Potassium chlorate	45
Shellac	5
Charcoal	5
Basic copper carbonate	10
Calomel	35

WHITE.

Saltpetre	66
Sulphur	16
Antimony sulphide	16
Gelatine	2

These coloured lights are primarily used for the stars of rockets, for the well known Bengal lights, and for other similar fire-works. The proportions given above can therefore be varied within reasonable limits.

For blue light, alum is sometimes used instead of, or in addition to, copper compounds. To white lights a little lead oxide or nitrate is added in some cases to neutralise the yellow effect due to traces of sodium salts. Calomel is often added, especially to blue and red lights, to increase the luminosity and decrease the rate of burning.

Powdered magnesium or aluminium mixed with the peroxides of calcium, magnesium, or manganese, along with a suitable quantity of strontium nitrate, gives a very brilliant and rapid red fire.

Barometer.

Storm Glass.

HERE is a simple method. Dissolve camphor, 150 grains, in 90 per cent. alcohol, 6 fluid drachms then add potassium nitrate and ammonium chloride, each 38 grains dissolved in distilled water, 9 fluid drachms. Place in a glass tube or bottle about 10 in. long and ¾ in. in diameter, and cover opening with a piece of bladder or parchment, tied round and pierced with a small pin hole. The suspended matter is supposed to settle at the bottom if the weather promises to be fine, and to rise in the liquid before a storm or high wind.

Here is an alternative method. Potassium nitrate, 30 grains, ammonium chloride, 30 grains; camphor, 120 grains; rectified spirit (56. o. p.) 2 fluid oz. Rub the salts to powder, dissolve the camphor in the spirit, and introduce into a test tube 10 in. long and ¾ in. in diameter; add the powdered salt, and tie over the top with a piece of bladder having a pin hole in it. If the weather promises to be fine the insoluble matter will settle to the bottom, while the liquid remains clear; before a storm or high wind a portion will rise and crystals will appear in the liquid.

Preserving Flowers.

By Hot Sand.

THE following method has been recommended as a means of preserving flowers and plants in their natural state.

One litre of fine white sand is sifted, washed, and dried; then the following solution is made. 3 gms of stearin, 3 gms of hard paraffin, and 3 gms. of salicylic acid in 100 gms. of absolute alcohol, dissolving by aid of heat. With this solution the sand, previously heated, is treated little by little, until all the grains are moistened, when the whole is exposed to the air to dry. The plants and flowers to be preserved are placed in a suitable box on a layer of the prepared sand, and more of the sand is sprinkled over them so as not to disturb the natural position, until they are completely covered. The box is now placed in a warm place for two days, after which time the sand is carefully drawn off, the best means of doing this being to provide the box with an opening in the bottom, from which a cork or other suitable stopper may be withdrawn.

THE ART OF PERFUMERY.

BY A PRACTICAL EXPERT.

PERFUMERY is the art of preparaing perfumes, or substances which are pleasing to the sense of smell.

Perfumes of various sorts have been held in high estimation from the most ancient times and to day the manufacture and nature of perfumes is a very extensive subject.

INDIAN PERFUMERY.

Perhaps no branch of industry purely devoted to the supply of luxuries is of such importance in India as that of perfumery. Perfumed oils for dressing the hair and beard and for anointing the body, perfumed waters for the bath, and, in the case of the rich, perfumed vapours for scenting the atmosphere of rooms, are all largely employed by all classes who can afford them, and have been so from the earliest times.

The term "perfume" is applied to those substances emitting an ageeable odour which are used about the person, the dress, and the dwelling. Besides the gratification of the senses derived from the employment of perfumes, many of the latter are credited with actual disinfecting properties, and are therefore, valuable from a hygienic point of view. All the essential oils of plants are more or less powerfully antiseptic.

Indeed perfumery is one of the most ancient and honourable of Indian crafts, and one which attains greatest importance at the present day in Northern India.

Jaunpore and Ghazipur might be described as the chief manufacturing localities, Delhi, Amritsar and Lahore the distributing centres, and Bombay the emporium of foreign transactions.

PERFUMES.

Perfumes may be divided into two main classes—crude and prepared. Crude perfumes comprise the aromatic substances derived from the animal and vegetable kingdoms. Animal perfumes occur almost exclusively as glandular secretions, and enter into commerce in their natural state.

Vegetable perfumes are mostly extracted from the flowers or herbs. Prepared perfumes embrace the numerous extracts or essences, pastilles and ribbons, incenses and sachet powders, waters and vinegars, and nosegays or bouquets.

Some of the most exquisite of perfumes are obtained from the most offensive substances. In olden times the most delicate perfumes were distilled from flowers, whose names they bore ; but chemistry has shown how to obtain them from other sources.

Natural perfumes probably reach their highest degree of excellence in the fragrance exhaled by fresh flowers. This fragrance is due to the minute traces of essential oil which exist in the petals, sometimes in the free state as in rose and lavender, and occasionally in the form of a glucoside which, under favourable conditions, is decomposed in the presence of an enzyme or ferment, as in jasmin and tuberose. The existence of a volatile oil, however, is by no means confined to the inflorescence, but frequently occurs in other parts of the vegetable organism.

For example it is found in the (1) Flowers of, cassie, carnation, clove, hyacinth, heliotrope, mimosa, jasmin, jonquille, orange blossom, rose, reseda, violet, and ylang ylang, (2) Flowers and leaves of, lavender, rosemary, peppermint, and violet. (3) Leaves and stems of, geranium, patchouli, petitgrain, verbena, and cinnamon. (4) Barks of, cavella, cinnamon, and cassia. (5) Woods of, cedar, linalol, and santal. (6) Roots of, angelica, sassafras, vetivert. (7) Rhizomes of, ginger, orris, and calamus. (8) Fruits of bergamot, lemon, lime and orange. (9) Seeds of, bitter almonds, anise (both kinds), fennel and nutmeg. (10) Gums or Oleoresinous exudations from, labdanum, myrrh, olibanum, Peru balsam, storax and tolu.

Some plants yield more than one odour, which are quite distinct and characteristic. The orange tree for instance, gives three, one from the leaves, one from the flowers and one from the rind of the fruit.

INDIGENOUS PERFUMES.

The following list of indigenous vegetable perfumes is by no means exhaustive :—Bakul, Balsam, Camphor, Cassie flower, Costus root, Champaka, Citronella, Frank incense, Geranium grass, Gum Benzoin, Gum Gugul, Henna plant, Ilang-Ilang, Jasmine, Keora, Khus Khus grass, Lavendula, Lemon grass, Myrtle, Myrrh, Musk mallow, Nutmeg, Oleander, Patchouli, Rose, Saffron, Sandal wood, red and white, Spikenard, Sumbul, Tuberose, Valerian, etc.

There are four odours of animal origin used in perfumery—namely, musk, ambergris, civet, and castor. The aroma of musk freely imparts odour to every body with which it is in contact. In perfumery manufacture tincture of musk is mixed with other odorous bodies to give permanence to the more evanescent perfumes or bouquets, the musk acting to them almost as a mordant does to a dyestuff. The finest musk, that which indeed is only really useful in perfumery, is distinguished as Tonquin musk.

Ambergris is a substance found in the intestines of the spermaceti whale when genuine ; ambergris has a peculiar odour, not easily described or imitated, and which is exceedingly diffusive, especially in solution, so that a very minute quantity of ambergris is perceptible in perfumes, and is thought to exalt their odour.

Civet is exceedingly potent as an odour, and when pure, and smelled at in the bulk of an ounce or so, is utterly in supportable from its nauseousness ; in this respect it exceeds musk. When, however, civet is diluted so as to afford but minute quantities to the olfactories, then its sweet perfume is generally admitted ! Civet is extensively used duly attenuated in perfumery. Its powerful and lasting odour enables it to be used in some soaps, and especially in sachets.

Castor, although it cannot be largely used in any given perfume on account of the almost blackness of its tincture, when properly diluted is extensively employed. Its perfumes, when old specially, is exceedingly pleasant and its fixing power is at least equal to that of musk.

CLASSIFICATION.

The scents mostly used in perfumery have been grouped by a celebrated perfumer under 18 kinds, represented by the following types: rose, jasmine, orange flower, tuberose, violet, balsam, spice, clove, camphor, sandal, citrine, lavender, mint, aniseed, almond, musk, amber, and fruit flavour.

Perfumes have been classified, according to their chemical composition, into seven principal groups as follows in order of importance and intensity :—(1) aldehydes ; (2) alcohols and esters ; (3) ketones ; (4) phenols and phenolic ethers ; (5) acids and acid anhydrides ; (6) nitrogenous substances ; (7) hydrocarbons.

ESSENTIAL OILS.

The bodies which are usually found in most essential oils may, with very few exceptions, be grouped under the following headings : (1) The Terpene and Camphor series ; (2) Benzene derivatives ; (3) Methane derivatives, (4) The Geraniol series.

The essential oils used in practice are derived from over twenty different botanical families, and are obtained from all parts of the world.

Thus, Asia provides camphor, cassia, cinnamon, ylang-ylang, star anise, patchouli, sandalwood, and grass oils such as citronella, lemon grass, palmarosa, and vetivert. From Africa comes clove and geranium oils ; from America sassafras, peppermint, linalol, petitgrain, cedarwood, bay, bois de rose and Canadian snake root. Australia provides eucalyptus, Europe provides the citrus oils, lemon, orange, and bergamot ; lavender, neroli, rosemary, petit-grain, aspic ; anise ; otto of roses ; caraway and clove.

METHODS OF EXTRACTION.

Two methods of separating perfumes having been known from very ancient times, namely enfleurage and distillation.

Certain of the perfumes are extracted by a process of distilling the flowers with water. The volatile essential oils distil over with steam, and afterwards condense in suitable receivers. The oil floats on the top and can be drawn off from the condensed water, which also retains a small amount of dissolved essence. This water may be used to distil a fresh mass of petals, but as a rule, a large amount of it is sold as rose water, jasmine water, etc.

There are however certain perfumes whose delicacy is affected by the heat and steam during distillation, and have their essences extracted by another method. This method is termed "enfleurage." The flowers are pressed against cold lard held on a plate glass in wooden frames. From day to day fresh flowers are laid upon the lard until it is saturated with the essences. According to this plan the perfumed lard has to be melted and strained from spent blossoms.

In the more modern method contact of the petals and lard is avoided, moist air is drawn through the flowers, and then conducted over the fatty layers, the lard duly absorbing the perfume. By whichever method the fat is charged, the perfume is extracted from it by shaking with concentrated alcohol. The alcohol is afterwards evaporated and the extract obtained as the quintescence of the flowers.

A variation in the process consists in stirring the flowers in melted lard. And subsequently filtering off the melted lard containing the perfume, leaving the exhausted flowers behind. According to another plan, which can be applied to all flowers, light petroleum spirit is employed to dissolve out the fragrant essences and the spirit afterwards evaporated by distillation in a vacuum. The quality of the perfume as obtained by the enfleurage process is far superior to that extracted by the other methods.

INDIAN METHOD.

The method of extraction in vogue in India is similar to that pursued by European perfumers technically known as *enfleurage* :—

A layer of the flowers from which the perfume is to be derived is placed on a clean masonry floor, to a thikness of half an inch ; over this is spread a layer of *til* seed a quarter of an inch thick, then another layer of flowers and another of seed, and so on till eight or ten altogether have been laid down. This heap is left all night ; next morning the flowers are removed, and the seeds are left all dry to dry in the sunshine. In the evening the process is repeated, layers of fresh flowers are laid down altornating with layers of the now partly perfumed seeds, and this goes on for ten days. The scented *til* is then put in bags or jars, till sufficient seed has been collected to press conveniently. It can be kept thus stored for a long time without losing the scent. As a rule, it is laid by for about a year, since the pressing can be done at any time under cover, while the perfuming can be carried on only during the dry season in the open air.

The scented seeds are ground in a *kolhu* or indigenous oilpress, a rough wooden mill consisting of the lower part of the trunk of a tree, fixed in the ground. This has the top hollowed into a large round cup, like a large mortar, in which rests the *lat*, a huge wooden pestle to which a bullock is harnessed. As he goes round the *lat* leans over the side of the hollow in the *kolhu*, pressing the seed. The oil thus extracted flows out through a small channel into a vessel set to catch the liquid. The oil after being purified is decanted into *kupis*, or leather bottles, of various shapes and sizes.

PERFUMERY.

The art of perfumery proper is concerned with the following :—

(1) Flower extracts,
(2) Basic perfumery essences,
(3) Handkerchief perfumes,
(4) Aromatic waters,
(5) Toilet waters,
(6) Toilet vinegars,
(7) Dry perfumes,
(8) Fumigants.

ARTIFICIAL PRODUCTS.

The scent industry has received a powerful impetus from synthetic scents. The majority of natural odours of the flowers are due to complex mixtures of different scents. Almost all of these scents have been successfully reproduced by mixtures of synthetic scents ranging from that of the violet to that of the rose.

An artificial essential oil is usually made by separating the various constituents of various natural oils, and blending these in such a manner—sometimes with the addition of other bodies—so as to produce a desired odour. Such artificial perfumes, then, are obtained in the main from naturally occurring oils. A synthetic perfume on the other hand, is entirely the product of the chemical laboratory, no natural oil or ingredient derived therefrom entering into its composition.

One of the earliest methods and examples in this line was the preparation of artificial vanillin. To-day it is prepared artificially from eugenol a comparatively inexpensive substance, the chief constituent of oil of cloves. By a series of steps employing oxidising agents such as ozone, eugenol can be transformed into vanillin.

Ionone is the name given to the artificial essence of violet. It is made from citral, a substance existing in considerable amount in essence of lemon, and in lemon grass oil to which the characteristic lemon odour of these materials is due. Citral and acetone heated with an alkali, condense and form pseudo-ionone, which when boiled with dilute sulphuric acid yields a mixture of two ionones. Most of the violet products are blends of these two ionones, In these examples the natural and artificial products are identical in composition.

ODORIFEROUS PRINCIPLES.

Before proceeding with the preparation of true perfumes, it is necessary to become acquainted with the several raw materials required in their manufacture; viz, the simple odorous substances, their origin, their preparation, and their peculiar qualities.

Besides these odorous raw materials, the art of perfumery makes use of a number of chemical and mineral products, whose quality largely influences that of the perfume to be made. These, therefore, must be carefully studied. Among these auxiliary substances are alcohol, glycerine, fixed oils and solid fats, which play an important part not only in the preparation of the perfumes but also enter into the composition of many. The handkerchief perfumes always contain a large quantity of alcohol, the scented hair oils consist largely of fixed oils, while solid fats of animal or vegetable origin occur in the so-called pomades. As will be found later on, the actual odours, owing to their extraordinary productiveness, constitute generally only a small percentage of the perfumes; the greatest bulk is usually either alcohol, fixed oil, or solid fat.

Hence, as the last named substances excepting the odoriferous materials, form the foundation of all articles of perfumery, the manufacturer must devote particular attention to their purity and must be thoroughly conversant with their qualities.

TOILET PERFUMES.

The perfumes for the toilet are either simple or compound ; the former are called extracts or essences, and the latter bouquets.

A good perfume should have no residue on evaporation, and the ingredients should be combined so harmoniously that no particular one should be perceptible.

The alcoholic perfumes, also called "Extraits d' Odeurs," are divided into flower odours, "Extraits aux fleurs," and into compound odours, "Boquets." The extracts of French flower pomades form the foundation of all Extraits d' Odeurs, all other additions serving the purpose of rendering these odours more pronounced and durable. Hence the art of the perfumer consists in attaining this object as perfectly as possible by the correct composition of the perfume materials at his disposal. Tinctures (infusions) are obtained by trituration of the raw materials with alcohol.

The number of flowers used by the perfumer is very limited, but by a judicious combination, or rather blending, almost any odour may be obtained.

The manufacture of handkerchief perfumes is thus very simple. If the finished extracts and perfumes are allowed to season for some length of time by storing them in cool place in well-closed vessels they will improve markedly in quality.

BLENDING.

The blending of perfumes requires considerable practical knowledge, both of the materials involved and their mutual reaction one upon the other, so that the best effect may be produced.

The commercial preparations sold as scents usually consist of a volatile liquid—usually alcohol—in which is dissolved the odoriferous body.

In all manipulations requiring the use of alcohol, only the finest alcohol, exclusively, of high strength, must be used, in order that the products may always be mixed without any turbidities.

The odoriferous body is usually composed of :—

(a) the distinctive odour. These have been classified as follows :—almond, amber, anise, balsamic, camphor, caryophyllaceous, citrine, fruity, jasmine, lavender, mint, musk, orange, rose, spicy, tuberose, violet.

(b) the modifiers. These are additional odours added to the distinctive perfume in order to 'mellow,' 'soften' or 'temper' it.

(c) the fixers. These are substances added to equalise the different rates of evaporation of the different perfumes. They are also known as binders.

FIXATION.

The floral odours are obtained in their original form from the fresh flowers, but as they are usually very volatile in character, some fixative substances are added to them to render them more permanent.

To prevent the rapid volatilization of the scent, to retain it or to fix it, extracts of various perfume materials, known as tinctures or extracts are used.

The art of fixation lies in being able to select those substances which, when blended with the more volatile constituents of a perfume, will prevent their rapid evaporation and at the same time retain the predominating note of their fragrance. The group of bodies from which suitable fixatives for any perfume may be selected is a large one, and their odours have been classified under three headings.

(a) Pleasantly aromatic, such as benzoin, olibanum, tolu, musk, ambergris, santal, salvia sclarea, benzyl isoeugenol, vanillin, coumarin, and heliotropin.

(b) Diagreeable, such as asafetida, valerian, civet, castor, and indol.

(c) Neutral, such as benzyl benzoate, ethyl phythalate, and glyceryl acetate.

All these bodies may be further classified as to their source, viz, animal, vegetable, and synthetic as has been indicated before.

ESSENCES.

Strictly speaking, essences are somewhat concentrated alcoholic solutions of the essential oils and other fragrant substances, whether obtained by simple admixture, by distillation or by digestion.

For making these the flower pomades are washed with strong alcohol. This is done by thorougly stirring the fat with an equal weight of alcohol, using a mechanically driven stirrer. By this treatment the alcohol washes out the perfume and dissolves it. The alcoholic solution is then drawn off, and subjected to a chilling process in order to separate from it the fat, a certain quantity of which it also dissolves out. The residual pomade is once again treated in similar manner with alcohol, whereby a second, but less powerfully odorous, extract is obtained, and which is utilized either as a second-quality extract, or as a solvent for fresh portions of pomade ; the pomade remaining after the treatment with alcohol, and which still always has a decided odour, is used as a base for fine soaps. Thus extracts of any desired concentration may be prepared.

Essences or extracts can be made in two ways : (1) in the case of aromatic substances which are obtainable in the pure state, e. g., (a) essential oils, by dissolving them in strong alcohol in definite proportions ; (2) in the case of aromatics combined with a fatty substance by treating (b) the pomade or (c) huile antique with the strongest alcohol.

TOILET WATER.

Toilet waters are either solutions of the fragrant essential oils in spirit, with or without the addition of other fragrant substances ; or they are distilled water, largely charged with the odorous principle of flowers.

DRY PERFUMES.

In ancient times dry perfumes were almost exclusively used, but at present the consumption of dry or solid perfumes is a limited one excepting fumigating agents. .

SACHET POWDERS.

Sachet powders are generally put into silk or satin bags or into ornamental paper envelopes and are useful for perfuming clothes, drawers, trunks, desks, letter paper, etc.

The incorporation of the powders with bags or envelopes is effected by dividing them between thin layers of cotton, bringing the cotton together with the powder in fine tissue paper into the desired shape and then enclosing them in the bag or envelope.

FUMIGATING AGENTS.

Fumigating agents are divided into liquid and dry, the first being alcoholic solutions, and perhaps most popular. They consist of extractions from resins, balsams, leaves, flowers, seeds, wood, and roots, compounded with volatile oils, alcohol, and alcoholic extracts from French flower pomades.

The obiect of fumigating living rooms, sleeping rooms, and sick chambers is not only to make abode in these rooms more ageeable by an attempt to cover the disagreeable odours, but chiefly to render them innoxious, thus combining the useful with the agreeable.

HINTS FOR MARKETING.

The demand for scents and perfumes is increasing rapidly and there will be a wide market for them for a long time to come. This demand can be met by India if the industry is properly organised. Large quantities of wild odoriferous products are running to waste. There is a possibility of enormously expanding this industry, and to lend impetus to it, a survey of the odoriferous materials of India must be undertaken.

All perfumes should be perfectly clear and free from turbidity. The phials must be perfectly dry as moisture tends to separate the aromatics.

The glass phials must have ground glass stoppers : for cork imparts its peculiar odour. To exclude air the stoppers are covered down to bottle necks with capsules of animal membrane.

Recipes.

OTTO—NATURAL.

Otto of Rose.

(I)

Here is a process of preparing natural rose otto from flowers.

The roses must be picked before their full expansion. Gently remove dirt, dust and other foreign matters from the petals. Care should be excercised in this respect otherwise the otto will be contaminated. The cleaned petals should then be placed in a clean vessel, of glass, porcelain or earthenware and covered up with pure water (rain or spring). Now place this vessel in some open space for a weak or so to be warmed by the sun. After 3 or 4 days an oily substance will float on the surface which will appear like a scum the next day. This is rose otto. These oily spots must be removed by sponging with a cotton swab and squeezed into a phial.

About two lakhs of roses are required to prepare 2½ tolas of pure rose otto. But the ottos sold in the market are generally adulterated with sandal oil. The roses must be all of the same variety otherwise the quality of the product will suffer.

(II)

Here is another new method.

Take 8 ch. of petals of red roses of the same variety. After freeing them of dirt and dust put them into a wide-mouthed glass bottle. Put in 30 grains of benzoic acid and pour in 8 ch. of pure sandal oil. Stopper the bottle closely and place in the sun for three days. Then squeeze out the digested petals and throw in 8 ch. fresh rose petals. Stopper the bottle and place in the sun. Repeat the process six or seven times. A concentrated otto of excellent quality will thus be obtained.

Otto Bella.

Take of 8 ch. freshly bloomed *bella* flowers (Arabian jasmine), white chalk, 2 ch. ; sandal oil, 1 seer.

First powder the chalk and boil it in water on an earthenware vessel. Remove after one hour, strain away the water and dry the chalk powder thoroughly. Now place the flowers on a wide-mouthed porcelain jar ; throw in the chalk powder and cover up the jar. After 3 days throw out the withered flowers. The powder should be gently sifted and put in a glass vessel. Now pour in the sandal oil and put in the sun daily for a fortnight. Finally filter through a flannel piece and the filtrate will be a good otto.

Otto Jasmine.

Petals of Jasmine, 2 chattaks ; sandal oil, 8 ch.

The stalks of the flowers must be gently removed with the help of a piece of broken glass avoiding contamination by hand. Then places ½ ch. of petals on a glass vessel, cover up with a piece of fine linen (muslin) ; pour on it 2 ch. of sandal oil. Then place another layer of ½ ch. of petals on the above ; cover up with linen and pour 2 ch. of oil. Deal with the whole quantity of petals arranged in 4 similar layers. Close up the vessel and set aside for 24 hours. Then strain out the spent flowers, reject them and repeat the above process with fresh flowers but with the same oil for half a dozen times. A good otto will be obtained.

Kantali Champak.

Select good champaka flowers, 100 ; sandal oil, 8 ch ; Benzoic acid, 15 grains.

Put the flowers in a glass vessel : add Benzoic acid and pour in the sandal oil, place the closed vessel in the sun for a week. Then strain out the flowers and put in fresh flowers in their place.

By repeating the process for 4 times a good otto will be obtained.

OTTO—ARTIFICIAL.

Otto Bella.

Heiko Bella	2	oz
Sandal Oil	8	oz

Mix together and keep aside for 15 days. Put in glass-stoppered phial.

Otto Bokool.

Heiko Bokool	2	oz
Sandal Oil	8	oz

The same.

Otto Chameli.

Heiko Chameli	2	oz
Sandal Oil	8	oz

The same.

Otto Rose.

Heiko Rose	2	oz
Sandal Oil	8	oz

The same.

Otto Champaka.

Heiko Champaka	2 oz
Sandal Oil	8 oz

The same.

Otto Keora.

Heiko Keora	2 oz
Sandal Oil	8 oz

The same.

Otto Motia.

Heiko Motia	2 oz
Sandal Oil	8 oz

The same.

Otto Khus Khus.

Heiko Khus Khus	2 oz
Sandal Oil	8 oz

The same.

Otto Tuberose.

Heiko Tuberose	2 oz
Sandal Oil	8 oz

The same.

Otto Lily.

Heiko Lily	2 oz
Sandal Oil	8 oz

The same.

Otto Patchouli.

Heiko Patchouli	2 oz
Sandal Oil	8 oz

The same.

Otto Neroli.

Heiko Neroli	2 oz
Sandal Oil	8 oz

The same.

Otto Jasmine.

Heiko Jasmine	2 oz
Sandal Oil	8 oz

The same.

Otto Musk.

Heiko Musk	2 oz
Sandal Oil	8 oz

The same.

ESSENCES—SIMPLE.

Easy processes of manufacturing popular essences are given below :

Ess. Bela.

Heiko Bela	1 oz
Rectified spirit (60 o. p.)	50 oz

Mix together in bottles. Allow to mature for a fortnight or more. During this period shake the bottles three times daily for 15 minutes every time.

Ess. Bokool.

Heiko Bokool	2 oz
Spirit	4 bottles

Proceed as before.

Ess. Chameli.

Heiko Chameli	2 oz
Spirit	4 bottles

Proceed as before.

Ess. Champaka.

Heiko Champaka	2 oz
Spirit	4 bottles

Proceed as before.

Ess. Rose.

Heiko Rose	4 dr
Spirit	24 oz

Proceed as before.

Ess. Keora.

Heiko Keora	1 oz
Spirit	2 bottles

Proceed as before.

Ess. Khus Khus.

Heiko Khus Khus	4 dr
Spirit	1 bottle

Proceed as before.

Ess. Motia.

Heiko Motia	4 dr
Spirit	1 bottle

Proceed as before.

Ess. Patchouli.

Heiko Patchouli	1 oz
Spirit	48 oz

Proceed as before.

Ess. Neroli.

Heiko Neroli	4	dr
Spirit	24	oz

Proceed as before.

Ess. Musk.

Heiko Musk	4	dr
Spirit	24	oz

Proceed as before.

Ess. Jasmine.

Heiko Jasmine	1	oz
Spirit	48	oz

Proceed as before.

Ess. Narcissus.

Heiko Narcissus	4	dr
Spirit	1	bottle

Proceed as before.

Ess. Opoponax.

Heiko Opoponax	4	dr
Ess. Amber	1	oz
Spirit	24	oz

Proceed as before.

Ess. Lily.

Heiko Lily	1	oz
Ess. Amber	2	oz
Spirit	48	oz

Proceed as before.

Ess. Lime-Blossom.

Heiko Lime-Blossom	1	oz
Ess. Amber	1	oz
Spirit	48	oz

Proceed as before.

Ess. Mimosa.

Heiko Mimosa	4	dr
Ess. Ambergris	1	oz
Spirit	24	oz

Proceed as before.

Ess. Tuberose.

Heiko Tuberose	1	oz
Ess. Ambergris	1	oz
Spirit	2	bottles

Proceed as before.

Lily of the Valley.

Heiko Lily of the Valley	4	dr
Ess. Musk	1	oz
Spirit	24	oz

Proceed as before.

Ess. Opala.

Heiko Opala	4	dr
Ess. Ambergris	1	oz
Spirit	1	bottle

Proceed as before.

Ess. Petunia.

Heiko Petunia	4	dr
Ess. Musk	1	oz
Spirit	24	oz

Proceed as before.

New Mown Hay.

Heiko New Mown Hay	1	oz
Musk	2	gr
Spirit	2	bottles

Proceed as before.

Ess. Reseda.

Heiko Reseda	4	dr
Musk	2	gr
Spirit	24	oz

Proceed as before.

Ess. White Rose.

Heiko White Rose	4	dr
Musk	2	gr
Spirit	24	oz

Proceed as before.

Ess. Tea Rose.

Heiko Tea Rose	4	dr
Musk	2	gr
Spirit	24	oz

Proceed as before.

Ess. Millefleurs.

Heiko Millefleurs	4	dr
Musk	2	gr
Spirit	24	oz

Proceed as before.

Ess. Lavenda.

Heiko Lavenda	8	dr
Cologne Spirit	24	oz

Directions same.

Ess. Lilac.

Heiko Lilac	1	oz
Cologne Spirit	24	oz

Directions same.

Ess. Amber.

Heiko Amber	8	dr
Spirit	1	bottle

Directions same.

Ess. Civet.

Heiko Civet	8	dr
Spirit	1	bottle

Directions same.

Ess. Cassia.

Oil Cassia	8	dr
Cologne Spirit	8	oz

Directions same.

Ess. Ylang Ylang.

Oil Ylang Ylang	3	dr
Cologne Spirit	16	oz

Directions same.

Ess. Violet.

Ess. Cassie	2	oz
,, Rose	1	oz
Tinct. Orris Root	1	oz

Directions same.

Ess. Cananga.

Oil Cananga (Java pure)	4	dr
Spirit	24	oz

The mixture will be ready for use after one month.

Ess. Rose Geranium.

Oil Geranium Rose (French)	1	oz
Spirit	2	bottle

The same directions.

Ess. Orange.

Oil Orange (Bitter extra fine)	1	oz
Spirit	2	bottles

The same directions.

Ess. Orris.

Oil Orris (Florentine)	4	dr
Spirit	24	oz

The same directions.

Ess. Ambergris.

Ambergris	12	dr
Cologne Spirit		gallon

Keep for 30 days in a closed vessel.

Ess. Tonka Bean.

Tonka Bean (in pieces)	8	oz
Cologne Spirit	½	gal

Directions same.

Ess. Vanilla.

Vanilla Bean	8	oz
Cologne Spirit	½	gal

Directions same.

Country attar must be employed in the following :—

Ess. Jasmine.

Otto of Jasmine	1½	tolas
Spirit	24	oz
Benzoic acid	15	gr

Mix together and allow to mature for a month, meanwhile shaking daily.

Ess. Hena.

Hena Otto	2	tolas
Benzoic acid	15	gr
Spirit	1	bottle

Proceed as above.

Ess. Bokool.

Bokool otto	2	tolas
Benzoic acid	15	gr
Spirit	1	bottle

ESS. HASU-NO-HANA.

Oil of Hasu-no-Hana	1	oz
Benzoic acid	15	gr
Spirit	48	oz

The same direction.

ESS. CHAMELI.

Oil of Chameli Flowers	1	tola
Benzoic acid	8	gr
Musk	2	gr
Spirit	16	oz

The same direction.

To be used after a fortnight.

ESS. SANDAL.

Otto Santal	1½	tolas
Benzoic acid	15	gr
Spirit	1	bottle

Proceed as above.

ESS. SANDAL WOOD.

Alcohol	8	oz
White chalk	4	tolas
Sandalwood dust	2	,,

Mix together and set aside for a week. Then strain through filter paper and add to the filtrate Sandal oil, ½ tola

Store in a bottle for 2 weeks.

ESSENCE—COMPOUND.

KISS-ME-QUICK.

Ess. Jasmine	2	ozs.
,, Orange Flower	2	,,
Spirit Tonka Bean	⅓	,,
,, Ambergris	1	dr.
Cologne Spirit	12	oz.

Mix together and use after one month.

JOCKEY CLUB.

Essence of Rose	4	oz.
,, Cassia	2	,,
,, Jasmine	4	,,
,, Ambergris	4	dr.
Tincture Orris	4	dr.

As above.

FRANGIPANNI.

Essence Orange Flower	4	oz.
,, Rose	4	,,
,, Sandal Wood	2	,,
,, Cassia	1	,,
Musk	2	gr.
Essence Ambergris	1	dr.

As above.

ESS. BOUQUET.

Ess. Cloves	2	dr
,, Geranium	5	dr
,, Citron	2	oz
,, Bergamot	2⅓	oz
,, Sassafras	2	oz
Rectified Spirit	6	pints

ES SPRING.

Tincture Orris	4	oz
Essence Jasmine	4	oz
Musk	8	gr
(or Ess. Musk 4 oz)		
Oil Neroli	30	mm
,, Bergamot	2	dr
,, Orange	1	oz
Spirit	4	pints

Mix together and filter after one month.

ESS. MUSK ROSE.

Otto de Rose	1	dr
Sandal Oil	1	dr
Musk	2	gr
Ess. Vanilla	1	oz
,, Jasmine	1	oz
Benzoic Acid	15	gr
Spirit	1	bottle

Mix together and filter after one month.

ESS. VICTORIA.

Otto de Rose (Virgin)	2	dr
Oil Neroli	2	dr
Otto of Coriander	16	mm.
,, Bergamot	4	dr

Otto Pimento	24	mm
,, Lavender	16	mm
Musk	4	gr
Benzoic Acid	2	dr
Spirit	4	bottles

Mix together.

BLACK PRINCE.

Otto de Rose (Virgin)	1	dr
Heiko Jasmine	1	dr
Otto of Orange Flower	1	dr
Otto of Bergamot	2	dr
Otto of Lavender	8	mm
Heiko Red Rose	4	dr
Musk	4	gr
Benzoic Acid	30	gr
Alcohol	2	bottles

Mix together and filter after one month.

MOSS ROSE.

Otto de Rose (Virgin)	2	dr
Sandal Oil	2	dr
Musk	8	gr
Extract of Vanilla	8	oz
Essence Jasmine	8	oz
Benzoic Acid	1	dr
Alcohol	4	bottles

Follow the directions given above.

AMERICAN BEAUTY.

Otto de Rose (Virgin)	4	dr
Ess. Neroli	1	oz
Heiko Rose	2	dr
Ess. Jasmine	1	oz
Otto Cedar Wood	12	mm
Musk	8	gr
Benzoic Acid	1	dr
Alcohol	4	bottles

HANDKERCHIEF ESSENCE.

These handkerchief perfumes are mixtures of essences and are prepared readily for urgent use.

(1)

Ess. Rose	16	oz
,, Keora	2	oz
,, Jasmine	2	oz
,, Lily of the Valley	3	oz
,, Amber	1	oz

Mix together : Shake for 15 minutes, three times a day for three days. Then use.

(2)

Ess. Chameli	16	oz
,, Rose	4	oz
,, Jasmine	2	oz
,, Neroli	1	oz
,, Amber	½	oz
,, Musk	½	oz

The same.

(3)

Ess. Champaka	12	oz
,, Narcissus	4	oz
,, Amber	2	oz
,, Rose	4	oz
,, Keora	2	oz

The same.

(4)

Ess. Neroli	12	oz
,, Motia	6	oz
,, Musk	1	oz
,, Bokool	2	oz
,, Jasmine	3	oz

The same.

AROMATIC WATERS.

ROSE WATER.

I.

Clean Rose petals	10	seers
Clean Water	1	md

The petals must be gathered from freshly blooming roses of one kind. The following apparatus will be necessary for distilling. A large copper still placed on an oven ; an earthenware condenser ; placed in a vessel of water ; a conducting pipe joining the two hermetically.

Put the flower and water in the still and apply to it gentle heat. The vapour will distil over and condense in the condenser : and the cool water in which it is immersed will be heated. The warm water must therefore be removed and cold water added from time to time. The operation may be stopped when about 15 to 20 seers of rose water is obtained.

II.

Easy Process.

Rose Petals	5 sr
Clear Water	10 sr

First put the cleaned rose petals in an earthen vessel. Next heat the water in another earthenware vessel. Then pour the boiling water on to the petals and close up the containing vessel so that air is excluded. Strain after one hour and the filtrate will be good rose water to serve all purposes.

III.

Rose Petals	5 sr
Water	10 sr

Put in all earthenware vessel ; close the mouth with a plate sealed with mud. Apply gentle heat for 3 hours and allow to cool. Strain when cold and the filtrate will be good rose water.

Keora Water.

I.

Keora flower	100
Water	1 md

Select only the white petals rejecting the green leaves and the pollen.

Proceed to distillation as with rose escribed above.

II.

Keora flower	50
Water	10 srs

Select only the white petals, over which pour boiling water as described above in case of rose. Set aside for 24 hours. Strain and phial.

III.

Keora flowers	50
Water	10 sr

Put the water in an earthenware vessel and throw in the white petals of keora. Place the whole in the sun for a week and strain. The filtrate will be a good keora water.

TOILET WATERS.

English Lavender Water.

Oil of Lavender (Mitchams)	4 oz
Rose Water	1 bottle
Magnesia Carbonate	q. s.
Alcohol	3 bottles

First macerate the oil of lavender with such a quantity of magnesia carbonate in a stone mortar that the whole mixture is converted into a powdery mass. Now pour the rose water and incorporate the powder well into it. Then strain into a glass jar and add alcohol. Store aside for six months.

Simple Spirit of Lavender.

Flowering tops of Lavender (imported)	2 lb
Rectified Spirit	8 pints
Water	16 pints

Distil until 8 pints are obtained.

Distilled Essence of Lavender.

Essential oil of English Lavender	4 oz
Rectified Spirit	100 oz.
Rose Water	20 oz

Distil over 100 ounces.

LAVENDER WATER.

(1)

Essential oil of English Lavender (Burgoyne)	4	oz
Otto de Rose (Virgin)	2	dr
Rectified Spirit	4	bottles

Mix together and use after three months.

(2)

Oil Lavender (Herrings)	3	oz
Rectified spirit	3	bottles
Tincture Orris	4	oz
Otto de Rose	1	dr

Mix together and use after one month.

(3)

Oil Lavender (Sempel B. P. 98)	4	oz
Rectified Spirit	4	bottles

Mix together and use after three months.

(4)

Oil Lavender (Grasse, France)	1	oz
Essence Ambergris	4	oz
Eau de Cologne	80	oz
Rectified Spirit	4	oz

Mix together and use after one month.

(5)

Oil of Lavender (English)	4	dr
Ess. of Bergamot	20	mm.
,, Lemon (or civet)	20	mm.
Otto de Rose	20	mm.
Ess. Ambergris	1	dr
Rectified Spirit	3	pints
Orange flower water	4	oz
Rose water	12	oz
Burnt alum	20	gr

Shake several times and store away in a cool place. Finally strain through filter paper.

(6)

Oil Lavender (Burgayne)	3	dr
,, Bergamot	3	dr
Otto de Rose	6	mm.
Oil Cloves	6	,,
Musk	2	gr
Oil of Rosemary (true)	1	dr
Honey	1	oz
Benzoic acid	2	scruples
Rectified Spirit	1	pint
Distilled water	3	oz

Mix together and allow to mature for 6 months.

(7)

Oil of Lavender (Mitchams)	3	dr
Oil of Bergamot	20	mm.
,, Neroli	6	mm.
Otto de Rose	6 or 12	mm.
Ess. of Civet	8 or 10	mm.
,, Musk	20	mm.
Rectified Spirit	20	oz
Orange flower water	4	oz

Mix together and shake for several times. Store away in a cool place for 3 months. Strain and use.

AMBER LAVENDER.

Oil of Lavender (English)	1	oz.
Essence Amber	6	,,
Rectified Spirit	1	bottle

Mix and use after 1 month.

LILY LAVENDER.

Oil of Lavender (English)	4	oz.
Essence Lily	24	,,
Rectified Spirit	4	bottles

Same procedure.

PETUNIA LAVENDER.

Oil of Lavender (English)	3	oz.
Essence Petunia	12	,,
Rectified Spirit	3	bottles

Same procedure.

Rose Lavender.

Oil of Lavender (English)	1 oz.
Rose Otto	2 dr.
Rectified Spirit	1 bottle

Same procedure.

Jasmine Lavender.

Oil of Lavender (English)	2 oz.
Essence Jasmine	8 ,,
Otto de Rose	30 mm.
Rectified Spirit	2 bottles

Same procedure.

Narcissus Lavender.

Oil of Lavender (English)	1 oz.
Essence Narcissus	4 ,,
Otto de Rose	30 mm.
Rectified Spirit	1 bottle

Same procedure.

Odoriferous Lavender Water.

Oil Lavender (Mitchams)	20 oz.
,, Bergamot (Burgoyne)	5 ,,
Ess. Ambergris	4 dr.
Orris Root Powder	4 oz.
Rectified Spirit	5 gals.

Mix together and strain after one month.

Ambergris Lavender Water.

Oil Lavender (Mitchams)	8 oz.
Ess. Musk	4 ,,
,, Ambergris	1½ ,,
Oil Bergamot	1½ ,,
Rectified Spirit	2 gals.

This will yield an excellent Lavender water. To be used after 3 months.

Eau de Lavander and Millefleurs.

Oil Lavender (English)	2 oz.
Ess. of Bergamot	1 dr.
,, Lemon	1 ,,
Otto de Rose	1 ,,
Ess. of Millefleurs	1½ oz.
,, Ambergriss	4 dr.
Rectified Spirit	6 pints.

Mix and use after 6 months.

Eau de Cologne.

I.

Oil Bergamot	1 oz.
,, Lemon	½ ,,
,, Rosemary	2 dr.
,, Neroli	30 mm.
,, Lavender	4 dr.
,, Orange	2 ,,
Rectified Spirit	2 lb.

Mix together and filter after a fortnight.

II.

Cardamom minor (seeds)	1 tola
Oil Neroli	14 mm.
,, Citron	14 ,,
,, Bergamot	14 ,,
,, Rosemary	14 ,,
Spirit	1 bottle.

Proceed as above.

III.

Otto of Orange Flower	1 dr.
Oil Orange	1 oz.
,, Lemon	1 ,,
Ess. Cedrat	4 dr.
Oil Rosemary	4 ,,
Oil Lavender	2 ,,
Spirit	1 bottle

Proceed as above.

IV.

Oil Neroli	30 mm.
,, Orange	1 dr.
,, Lemon	1 ,,
,, Rosemary	30 mm.
Ess. Bargamot	4 dr.
Spirit	20 oz.

Proceed as above.

V.

Oil Neroli	2½ dr.
,, Lavender	50 mm.
,, Orange	50 ,,
,, Rosemary	40 ,,
,, Lemon	4 dr.
,, Bergamot	1 oz.
Spirit	1 oz

Proceed as above.

HAIR LOTION.

The following are hair lotions :—

Tinture Cantharides	1½ dr.
Aqua Sambuci	11 oz.
Ess. Rosemary (double)	5 dr.

Mix and shake well. Will promote the growth of hair.

MILLEFLEURS LOTION.

Oil Lavender	3 oz
Ess. Lemon	3 ,,
,, Ambergris	4 ,,
Oil Caraway	2 ,,
Rose Water	12 ..

Mix and shake well. To be used after 3 months.

HOVENIA.

Rectified Spirit	1 quart.
Rose water	½ pint
Essential oil of Lemon	½ oz.
Otto de Rose	15 mm.
Oil of Cloves	30 ,,
,, Neroli	10 ,,

Mix together : shake well ; leave aside for 1 month.

HUNGARY WATER.

Rectified Spirit	1 pint
Oil of Rosemary	1 oz.
Ess. Ambergris	2 dr.
Rose water	6 oz.

Mix together : shake well : and leave aside for one month.

ODOR DELECTABILIS.

Rose Water	4 oz.
Orange Flower	4 ,,
Oil of Lavender	1 dr.
,, Cloves	1 ,,
,, Bergamot	2 ,,
Musk	2 gr.
Rectified Spirit	1 pint

Mix together and shake well. Use after 1 month.

POMATUM.

(1)

Prepared suet, olive oil, each 8 ounces, lard 4 ounces. Melt in a water bath, then remove the vessel, and, when it begins to thicken, stir in the following scents, in quantity at discretion :—Oil of cloves, sixty drops ; neroli, twenty drops ; oil lavender, sixty drops ; oil bergamot, 90 drops ; essence of ambergris, fifty drops ; essence musk, fifty drops ; mix. A slight colour may be given to it, according to the fancy of the manufacturers with alkanet root or gamboge root.

(2)

Strained suet, ten pounds ; white wax, three quarters of a pound. Melt, then stir well in essence of bergamot, one ounce ; essence of lemon, half an ounce ; oil of resemary, quarter of an ounce ; oil of lavender, quarter of an ounce ; rose water, one pint.

(3)

Clarified lard, twelve pounds ; clarified suet, two pounds ; essence of bergamot, one ounce ; essence of lemon, half an ounce ; oil of lavender, quarter of an ounce ; rose water, eight ounces. Melt the first two, then take the pan from the fire and stir in the essences.

POMADE A LA ROSE.

Lard, four pounds ; suet, 1 pound ; alkanet, one pound Macerate with heat to give a faint colour, then allow it to cool, and before it sets, stir in rose water, five ounces ; otto of roses to perfume.

POMADE A LA JASMIN.

Lard, suet, each one pound ; oil of almondo, four ounces. Mix, then add spirits of jasmin, an ounce and a half.

MISCELLANEOUS.

FUMIGATING PASTILS.

Powdered gum-benzoin, 16 parts ; Balsam of tolu and powdered Sandalwood, of each, 4 parts ; a light charcoal, 48 parts ; powdered tragacanth and true labdanum, of each, 1 part ; powdered nitre and gum arabic, of each 2 parts ; cinnamon water, 12 parts.

Mix together and form the mass into small cones and dry them in the air.

Scent Cards.

Coumarin	10 gr.
Vanillin	10 ,,
Heliotropine	10 ,,
Ionone	10' mm.
Hyacinthine	5 ,,
Essence of Musk	30 ,,
Otto of Rose	5 ,,
Rectified Spirit	1 fl. oz.

Mix thoroughly and soak a piece of blotting paper in the mixture. The cards to be scented are put up in a closed box along with the blotting paper for a day or so. The cards will imbibe the scent.

Incense.

Olibanum	2 lb.
Benzoin	3 oz.
Cascarilla Bark	2 ,,
Styrax Calamita	1 ,,

Powder and mix.

Sachet Powder.

Lavender flowers	3 lb
Thyme (Dried)	3 oz
Mint ,,	3 oz
Cloves	1 oz
Caraway (seeds)	1 oz
Salt	1 oz

Rub the lavender flowers from the stalk ; reduce to powder the thyme and mint ; bruise the cloves and caraway seeds in a mortar. Dry the salt and finely powder it. Mix the ingredients; put in muslin bags.

[N. B.—The spirit employed in the art of perfumery should be selected with great care. It should be perfectly free from grain oil and other impurities. It should be 60 over proof unless otherwise mentioned, preferably of Messrs *D.* Waldie & Co.

The proper names bracketed by the side of any article stands for a noted make or its maker. Often a particular perfume of a particular manufacturer will yield a product of superior quality. It is therefore desirable that the article recommended be employed.]

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PERFUMERS.

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2. Schimmel & Co , Miltitz bei Leipzig, Germany.

3. Heine & Co., A—G., Leipzig, U. Groba, (Elbe), Germany.

4. Samsul Arfeen & Co., 9, Coolootola Street, Calcutta.

5. B.K. Paul & Co., 1-3, Bonfield's Lane, Calcutta.

6. Gangasagar Amarnath, 85, Coolootola Street, Calcutta.

7. P. Mukherjee & Co., 28-29, College Street Market, Calcutta.

8. Sikri & Co., 55-18, Canning Street, Calcutta.

9. Perfumery Raw Materials Co., Kashatriya Duyati Nivas, Charni Road, Girgaon, Bombay.

10. D. G. Gore, Sayana Bldgs., Lohar Street, Bombay.

1 Quart = 2 Pints = 40 fl. oz.
1 seer = 16 chs. = 2 lbs. = 32 oz.
1 oz = 2½ tolas. 1 Bottle = 24 oz.

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Tapioca.

TAPIOCA is the farina deposited from the expressed juice of the Jatropha manihot. It is chiefly produced from the various varieties of Jatropha, which flourish in the West Indies, South America and the Southern part of North America. The plant belongs to the Euphorbiaceae (milk worts), and is a native of Brazil whence it has been carried to all the warmer parts of the world. It is extensively cultivated in gardens. It will thrive in any soil, although a sandy loam is the best. It requires no cultivation whatever, and is occasionally met with in Arracan, growing wild in jungle.

Tapioca is prepared in S. America from two species of Janipha, or the bitter and sweet cassava or manioc roots. From the facility with which the bitter cassava can be rasped into flour, it is cultivated almost to the exclusion of the sweet variety, which contains in its centre a tought fibreous ligneous cord, which is absent in the bitter variety. The latter, however, contains a highly acid, and poisonous juice which is got rid of by heat or by fermentation, so that the cassava bread is quite free from it. When the juice has been carefully expressed, the fecula or flour is washed and dried in the air without heat, and forms the Brazilian arrowroot of commerce ; but when dried on hot plates its becomes granular and forms tapioca. An artificial tapioca is made with gum and potato starch. The granules of this are larger, whiter, and moro brittle and more soluble in cold water than genuine tapioca.

Great care is requisite with preparation of the farina as they contain a poisonous principle, which is only got rid of by the application of strong heat.

The name cassava should properly apply only to the meal obtained from the roots of the plants, but it has passed into use to designate the plant itself. Cassava starch only differs from tapioca flour in being of a less lumpy character and appearance. Flake and pearl tapioca are partially cooked products. A less confusing nomenclature is to restrict the name manioc to the starchy substances derived from its tubers, and tapioca to the product manufactured from its starch.

The mainoc plant is cultivated for its starchy roots which are extensively used as human food, especially in the tropics, as food for live stock, and for the manufacture of starch.

All the varieties of bitter manioc, the most important as starch producers, contain a certain amount of poison, but fortunately this is very volatile and may be entirely dissipated by moderate heating or by exposure for a few hours to the sun, and roots which have been cooled may be eaten with perfect safety. The bitter manioc is the source from which nearly all tapioca is manufactured and it also forms the principal bread substitute food in many tropical countries,

Citric Acid.

CITRIC acid, as its name implies, occurs principally in the juice of the citrus fruits and is chiefly responsible for the sour taste of these fruits. Commercially it is derived mainly from the juice of the lemon, although smaller amounts are obtained from the lime, bergamot and orange. Citric acid is usually made from the inferior fruit or "cull lemons" which have been damaged by insects, fungi or frost, or which are missbapen, undersized or even oversized. It may be regarded, therefore, as a by-product of the lemon-growing industry.

The principal use of citric acid is in the manufacture of beverages and effervescent salts. It is also used in the manufacture of many salts which are used in medicine, including the citrates of ammonium, bismuth, caffeine, iron, lithium, mangesium, potassium, quinine and sodium. Citric acid and sodium citrate find some application in textile printing and in the manufacture of a few dyes. Many formulas for photographic developers and toning baths contain citric acid or sodium citrate. Ferric ammonium citrate is used in the manufacture of blue print paper. Citric and ammonium citrate are important laboratory reagents. They are essential for the determination of phosphates in fertilizers, which ranks as one of the most important of analytical operations.

Citrate of lime is an intermediate substance obtained in the manufacture of citric acid from the fruit juices and is used for making citric acid.

The manufacture of citric acid from citrate of lime is a relatively complex chemical operation, requiring special equipment and careful chemical control.

Lemon oil, although entirely different from citric acid in chemical nature and uses, is, like citric acid, a by-product of the fruit-growing industry, and is, therefore, conveniently discussed with citric acid. It is used in flavouring extracts, perfumes, and medicine.

The chief centres of the lemon-growing industry, and, therefore, the chief sources of the by-products, are Sicily, California, and the West Indies.

The Sicilians cut the fruit in two and remove the pulp from the peel by means of a single knife operated by hand. The lemon oil is then pressed of the peel into a sponge by the aid of a simple tool operated by hand. The lemon oil obtained in this way is the highest quality hand-pressed oil. The peel is uninjured and may be candied. The pulp is mechanically shredded and the juice separated in a press. The residue in the press may be fed to cattle or goats. The juice is filtered and heated nearly to the boiling point. Finely divided chalk is then added. The citric acid present in the juice combines chemically with the chalk, forming citrate of lime, a white insoluble powder which can be readily filtered, washed, and dried.

Chemically pure citrate of lime contains 73.67 per cent. expressed as crystallized citric acid. Commercially the citric acid content of lime varies from about 60 to 67 per cent. The standard commercial strength is 64 per cent.

The manufacture of citric acid from citrate of lime, although simple in theory, requires careful attention to details, because the product is used chiefly in drugs and beverages, and must therefore be of a high degree of purity. The citrate of lime is treated with dilute sulphuric acid and is filtered from the precipitated calcium sulphate. It is then concentrated by evaporation and recovered by crystallization. The crystals are usually redissolved, the solution decolorized by animal charcoal and chemically treated to remove traces of impurities, especially iron or lead derived from the vessel. The acid is then recovered by evaporation and crystallization.

Colour in Nature.

COLOUR in nature has utilitarian purpose as well as its decorative, writes the Scientific American. The colouring on animals affords them protection by causing them to blend with their surroundings so that their natural enemies and man cannot easily find them. The green colouring matter in leaves is a chemical reagent and converts the carbonic acid gas taken into the plant from the air into starch and cellulose and the complex substances found in plants. The beautiful coloration of flowers serves to attract to them the pollen-bearing insects. The yellow stripes of colour on the skin of the tiger, the sandy skin of the lion, the spots of the leopard, the stripe of the zebra, the white fur of the polar animals, the dull coloration of fishes, the brown colour of insects are all examples of protective coloration. On the other hand the brilliant colour of the feathers of birds are for decorative effect only and play a part in sexual attraction.

The average person is apt to think that all the colour effects that are seen in nature are produced by the presence of certain substances, dyes or the like, which possess distinctive colours. This is true to a certain extent as it has been found that the colours in flowers are due to the presence of substances known as anthocyan pigments. But the dispersion of light in striking scales and other agencies such as minute air cells is sometime the cause of the colours that are seen in birds' feathers. Thus the feathers of the blue bird, the kingfisher and other birds are coloured blue due to the dispersion of the light striking the minute air cells in the horny structure of the feathers. So far no blue pigment has been extracted from these feathers.

Similarly the brilliant iridiscent purs in the tail feathers of the acock or in the throat feathers of the umming bird are not due to the presence of any pigments in the feathers, but to the dispersion of light by the thin laminae in the barbules of the feathers. This conclusion is substantiated by the fact that when the feather of the peacock is viewed in transmitted light, it shows none of the colour effects that are seen when the light is reflected and refracted from the surface of the same, and further more different colour effects can be seen by having the light strike the feathers at different angles. On the other hand certain bird feathers also possess colour pigments which either determine the colour of the feathers alone or serve as a back-ground for the colour effects produced by the action of light.

The blue of the sky and the blue of the human and animal eye are also caused by the action of light. In the first place the dust in the air causes the dispersion of the light and its decomposition into its compound parts, while in the case of the eye it is due to the presence of finely divided particles suspended in the liquid medium of the iris. Green, brown and black eyes take their colour from a combination of this light dispersion effect and the presence of actual colour in the eye. Flowers and fruits owe their colour principally to the presence of pigments in them, although in the case of the lily, the white colour is due to the structural make-up of the petals.

Of course the number of different colouring matters in nature is very great, but probably the most interesting and most important of these substances are the anthocyans, which produce some of the most beautiful effects. It has been found that the colour of the flower or the fruit depends not only on the presence of some of this series of colouring matters but also on the presence of certain other substances such as tannin or iron salts. Then again the colour will vary acording to whether the anthocyan is present in the fruits or flower either in the free or combined state.

Novelties.

To Construct a Small Telescope.

A small telescope may be constructed at home with ordinary tools.

Procure from a reliable optician a concavo-convex lens of 60 inches focus, spherically ground, and about two inches in diameter (an uncut spectacle lens will suffice.) Also buy a little hand magnifier, powerful enough to enlarge objects four or five diameters. If an extra-serviceable telescope be desired, two magnifying lenses may be bought, the stronger somewhat smaller than the larger. The large, thin spectacle lens is to be the object lens of the telescope. It magnifies but little. It is not meant to enlarge; its function is to be a light-gatherer. Mount the lens in the front end of a length of pipe. Rain pipe or stove pipe will do. Be sure that the lens fits well in the tube, and that the tube is straight. Hold it in place with rings of paper. Cut off the long tube about six inches shorter than the focal length of the lens. To determine this distance hold the lens against the sun and ascertain how far away the lean bright spot falls. Now fix a smaller focussing tube so that it will slide the long tube.

Supposing now that a three lens telescope is to be made, set the larger of the two high powered lenses part way down the focussing tube and fasten it with paper rings. Push the smaller lens towards it until dust particles appear in silhouette upon the former's nearer face. Push it in a little more, until the dust blurs out of sight. Then fasten the little lens here for the adjustment has been effected.

The middle lens is called the field lens, while the small lens is known as the eye lens.

Pharaoh's Serpents.

Pharaoh's Serpents, also known as Python Eggs are chemical toys. They are prepared as follows. First nitrate of mercury is obtained by dissolving mercury, with the aid of heat, in dilute nitric acid, taking care that there is always an excess of mercury present. When the action of the acid has ceased, the solution is decanted and a solution of potassium sulphocyanide is poured into it. About equal quantities of the two solutions are used. A precipitate of sulpho-cyanide of mercury falls out, which should be filtered off, washed and dried.

Now for every pound of this precipitate one ounce of gum tragacanth is soaked in water. When the gum is completely softened it is taken in a mortar and the mercury sulpho-cyanide is gradually rubbed up with it into a homogenous paste. A little water may be added if required. This pasty mass is finally filled into cylindrical moulds $\frac{1}{8}$th of an inch in diameter made of silvered paper and dried.

When these pellets are ignited at the tapering end they leave an enormous volume of ash, which proceed in great serpentine coils from the body of the mass. The stuff is highly poisonous as also the gas evolved on ignition. One must therefore be careful in playing with them.

Ideas for Small Capitalists.

Brick, Tile and Lime Industry.

Mr. E. Lakkaraju Naidu of Kharagpur sends us the following :—

Out of the three important building materials, brick and lime are the most important and the demand for the same is increasing in every town year by year. Living in pucca houses is the fashion of the times : hence the new constructions ; and as for the old, repairs have to be made. This industry is one ot the best paying one. Ordinary clay for bricks and lime stone for lime are the raw materials required and the fuel used can be wood or dust coal. In the primary stage there is no necessity of a permanent brick kiln but the sun-dried bricks are piled up vertically, tapering like a pyramid as it rises ; and in a kiln of this stamp 100,000 bricks can be easily burned. The outside of kiln is mud plastered to utilise the whole heat. The burning will take 3 to 4 days varying according to the number of bricks in the kiln and the nature of fuel used. If tiles and bricks are jointly burnt tiles must be placed above the bricks. 10 to 15 days are required for the kiln to cool and when it is sufficiently cool one side is opened and the bricks are ready for marketing. Bricks are generally classed as first, second and third. The damaged or unburnt ones are generally rejected. All sound bricks red in colour, and with no disfigurement in shape and size are first class bricks. It contains less pores and when sounded gives out the sonorous tone of bell-metal. It the bricks are to be 10"×4½"×3", the standard size of the public works departments, moulds of wood measuring inside 10¼"×4.7"×3.4" are used. Mud is well mixed up before moulding adding the right quantity of water and mixing the whole with feet and hands making it plastic and free from stones and dirt. The sides of the mould are wetted in each case. The bricks are properly dried in the sun. The number of first class bricks turned out depend on the carefulness with which the bricks are made in the wet stage. First class bricks of the above size are sold at Rs. 25 a thousand, the minimum. The rejected ones also can be used in balast and surkee with bats.

LIME—Hydraulic lime is produced by burning lime stone. Lime stone is generally found in clay soil and there are some special places where these stones are found in abundance. These are collected by the villagers, who sells them by baskets at one anna each or Rs. 1-4 a cartload. Lime kilns are round or oblong. They vary in height from 4 to 12 feet. Mud or brick walls will serve the purpose. Generally cinder is used for fuel. The universal ratio of mixing cinder and lime stone is 2 : 1 and for dust coal the ratio is 4 : 1. The product is placed in the kiln and lit at the bottom through holes kept for the purpose where it is heated to that temperature at which it will give off part of its constituents in the form of carbon dioxide. The heat must be applied gradually and for a definite time only which varies from 2 to 3 days depending on the local conditions. The products (quick lime) now removed from the kiln is watered with a garden-can ; it is turned all over so that every part might come in contact with water which converts the mass to calcium hydrate or slaked lime. The slaking is accompanied by an increase in volume as well as weight and the cinder dust (ashes) helps further increase in the volume. But over and under burning should be avoided. The lime slaked or unslaked is ready for packing and marketing after the seventh day. Lime is sold by weight and a capital of Rs. 100 will do for a start.

Small Trades & Recipes.

Date Paste.

Dates	6 lb.
White Gum	20 lb.
Loaf Sugar	2 lb.
Glucose	2 lb.
Rose Water	5 lb.
Water	50 lb.

Cut the dates into small pieces and throw away the stones. Powder the gum and crush the sugar.

Boil the dates in ordinary water till reduced to a paste ; strain through a piece of cloth and let the pulp settle. Then dissolve the gum in this and strain again. Now add sugar and glucose and allow to set.

Crystallised Roses.

Large roses are selected during winter : they are then crystallised two or three times in succession. Care must be taken to dry them well after each crystallisation. For that purpose put them up in a dry chamber for 4 or 5 days. The sugar of the crystallising syrup (at 35° Be) is to be perfumed with rose otto and suitably coloured.. Roses thus treated will keep for a very long time.

Turkish Zujak.

As a rule, the confection of Turkey are exceedingly luscious, buttery and exceedingly fragarant. But in the long list of the confectionery of the Turkomen the Zujak of the Turkish harem is the most unique. This is a sweet prepared from nuts such as pistachio, sweet almond, walnut, etc. After being strung they are dipped in a vat containing a mixture of steam prepared vegetable gelatine with the delectable crystalline palm or date syrup. Raisin syrup and pomegranate sugar are also sometimes used for this purpose. Dipping is done only when the temperature of the bath is almost at the solidification point, at which moment a few drops of attar of roses are added. These are diffused throughout the mass by a few revolutions of the mechanical ladle and they are prevented from being diffused into the air by the minimum temperature.

After the rose flavour has been added and properly mixed, the stringed nuts are at once lowered, by the dozen or score strings suspended from a frame, into the vat lifted out ; then allowed to dry. The process is repeated, dip after dip, until the desired thickness of confection coating is deposited on the nuts. Great care is taken to make the coating of the Zujak as transparent as possible so that the particular nut from which it has been prepared may be visible.

Zujak is a most nutritious confection food, being very rich. Moreover its delightful perfume makes it agreeably palatable.

Home Hints.

The odour of bad smoke in a room may be dissipated by buring orange peel.

A few drops of coal oil added to the water with which windows are to be washed will save time and labour.

All traces of mud may be readily removed from black clothing by rubbing the spots with a piece of raw potato.

Severe pains in the stomach after eating will be almost instantly relieved by drinking a teaspoonful of salt in a glass of cold water.

Use borax in cleaning house. It does not ruin paint, whitens the curtains and does not stain the carpets which are washed with it.

Water should never be used on burning oil, as it spreads the flame. Dry sand should be used, as this extinguishes the flames immediatly.

Glycerine and lemon juice applied with a soft brush or rag will remove freckles, but care must be taken that the skin is not exposed much to the sun.

A wart may be removed by damping it and rubbing it three or four times a day for a month with a piece of common soda. It will drop off, leaving no mark on the skin.

To make a cold cream for the toilet, melt together one ounce of white wax and spermaceti adding four ounces of oil almonds. Stir this constantly while it is cooling.

If milk is heated until lukewarm and then quickly chilled, there will be much more cream.

Freshness of eggs may be tested by putting them into water. A fresh egg will remain at the bottom, one not so fresh will float a little higher, and a bad one will rise to the surface.

For cleaning jewellery, there is nothing better than ammonia and water. If dull or dirty, rub a little soap on a soft brush and brush them in this wash. Rinse in cold water and polish with chamois.

For a burn one of the best aids is to immerse the part in kerosene for ten or fifteen minutes, if possible, or cover closely for some time with a cotton cloth dipped in the oil. The soreness will soon leave.

Vaseline applied to the eye brow at night will stimulate the growth, and tend to darken them at the same time. It is a good thing to keep a tiny eyebrow brush and use it every day, training the hair carefully. The brushing stimulates the hair roots just as the same treatment does the scalp.

Of all foods cereals are those that contain most soluble phosphates; which serve as nutrients to the bones. This is especially important in the diet of children. It is an established fact that children fed with very moist food will be gigantic in stature compared with those nourished on dried, smoked, spiced, astringent or tonic food administered sparingly.

SCIENTIFIC AND INDUSTRIAL TOPICS.

Copper-plating Insects

A novel process of copper-plating insects has been brought to the notice of the Academy of Sciences in Paris. Powdered with copper oxide the insects are heated in a current of carbon dioxide and on cooling are found to be coated with a thin film of copper. It is suggested that copper carbonyl, analogous to nickel carbonyl, is first formed, then reduced to the metallic state, though this copper carbon compound has not before been known. The insect is completely metalized by the reduced copper and the process is believed to have promise as a means of preserving delicate zoological and botanical specimens of various kinds.

Waste Vegetable Fuel.

The amount of waste going on throughout the world by the non-utilisation of waste vegetable fuels such as "begasse" (spent sugar cane), paper-mill refuse, sawdust, shavings, spent tan bark, the residue from various wood extracts, etc. etc, is enormous, although increased attention is certainly now being given to this question. In the case of sawdust, shavings, small blocks and scraps of wood, pieces of bark, and general wood waste, considerable progress has however been made, particularly for steam generation, and considerable economies effected. In fact the heat available is so great in many cases that it is difficult to find a use for the amount of electrical power generated, and much attention is being paid in the United States and Canada to the development of wood alcohol plants.

Gold from Mercury.

It has recently been reported in the technical press that Professor Miethe, of the Photo-Chemical Laboratory of Charlottenburg Technical High School, had announced that he had succeeded in breaking up the atom of mercury into other elements, one of which is gold. This disintegration is said to have been effected by means of the electric mercury lamp. The professor explains that this discovery does not mean that henceforth gold can be obtained from mercury on a commercial scale, as the cost of producing one kilogramme of it from this source would come to about one million pounds sterling several cubic yards of mercury yield only 1-30000th. of an ounce of gold.

Patterns by Electro Deposition.

Where a few castings of a kind are needed, patterns are usually made of wood ; but in the case of castings which have to be repeated many times, metal patterns formed by casting have decided advantages. Patterns can now be made by electro deposition in the interior of moulds made from the object to be copied. Outside they will be of precisely the same size and form as the original. They in turn are used as patterns from which to form the moulds for the castings required. As electro-deposition copies with the utmost fidelity the surface on which the metal is deposited, no filing, scraping, or machining is needed if the original pattern was highly finished.

Retardation of Spoiling of Butter.

A new-method of butter manufacture is now being tried out in Holland and is meeting with considerable success. The main feature in this new process is that it delays the deterioration and the spoiling of butter. The new process consists in conducting the churning operation in an atmosphere of carbon dioxide. The air is sucked out of the churn and is replaced by carbon dioxide, which fills the pores of the butter and keeps out the oxygen as long as the butter is not vigorously agitated after exposure to the air. The natural process of deterioration is accelerated by the oxygen and any temperature above the point where the butter fats would congeal and close up the minute spaces where the oxygen could penetrate and produce reactions. The consumption of carbon dioxide in the new method of manufacture is said to be approximately one kilogram for every thousand kilograms of butter and its cost, together with that of the process, is considered negligible in view of the advantages gained.

A Celluloid Mirror.

A most curious and interesting novelty was shown by a British firm of instrument makers at a recent scientific exhibition in London, England. In optical appliances there is an objection to the use of the ordinary silver back glass mirror on account of the double reflection from the surface of the glass and from the surface of the silver backing. The novelty mentioned consists of mirrors made of celluloid. The celluloid is made by a special process which gives a film of extraordinary thinness. Portions of such films several inches square are mounted in frames of sheet aluminium and form a strong mirror which only very slightly weakens the light of the reflected beam. Mirrors of this type have been already used in a number of optical instruments with great success.

Films in Relief.

Cinematograph films in relief giving the illusion of perspective and atmosphere seem to be near realisation. Demonstrations of a new process invented by M. Demetri Daponte, a Rumanian, who has studied the problem for eight years, were recently given in Paris. Hitherto all the efforts to produce this illusion have been concentrated on developing the old principle of the stereoscope—the observation of duplicate views through two separate lenses, or two glasses, red and green. This old process involved the use of an apparatus placed before the eyes, through which the image projected on to the screen is viewed. M. Daponte has proceeded on different principles. He has discovered that the super-imposition of two views, each taken with a different objective, surrounds the object with an "atmosphere," and gives the illusion of relief and depth provided that the intensity of the light in one view differs from that of the other.

The problem to be solved is the discovery of a system by which the lighting of the two views may be constantly changed in such a manner as to give to each view a constant light, but differing in intensity one from the other. This is what M. Daponte claims to have achieved by passing two luminous rays through a "pulsating" disc more or less opaque, and thus lighting the two views alternately. The rays of the two projectors converge on the screen, on which appears a single view, presenting to the eye a perfect stereoscopic image.

FORMULAS, PROCESSES & ANSWERS.

Aluminium Sulphocyanide in Dyeing.

1834 V. B. R. M, Masulipatam. Enquires about the use of aluminium sulphocyanide in dyeing.

Aluminium sulphocyanide was introduced by Storck for the production of alizarin reds in calico-printing as a substitute for aluminium acetate. It possesses the great advantage that it does not attack the steel doctors of the printing machine, and thus does not introduce iron into the printing colour, hence the purity and brilliancy of alizarin red is preserved. The high price of the article has prevented its more general employment, especially in wool dyeing. Very fine results are obtained by mordanting this fibre with aulminium thiocyanate. The wool is introduced into the cold mordanting bath, which is gradually heated to boiling during one to one and a half hours. Silk may be mordanted like wool. The thiocyanate is also used in silk-printing.

Dressings for Boot Soles and Uppers.

1622 G. C. P., Agra. Requests us to publish recipes for dressings for boot soles and uppers.

(1) Dressings for boot soles.

Paraffin Wax	5
Linseed Oil	5
Turpentine	1

By parts.

Melt the wax and mix in the other two away from fire.

Apply to the boot soles while still warm. Scrape off the superficial layer while cold. The mixture penetrates deep into the pores of leather.

(2) Soap grease for boot uppers.

Dissolve 4 parts of soap in 40 parts of water. Add to the solution 4 parts of glycerine, 1 of beef tallow, 1 of fish oil, and finally 1 of colophony. Boil the whole mixture for some time and then stir until cold.

Good Shaving Soap.

1775 N. D., Bombay. Requests us to furnish a recipe for good shaving soap.

Shaving soaps are required to produce a good and persistent lather which, when formed on the face, will remain practically permanent. At the same time the soap must not have any action on the skin, however tender that may be. To make such a soap a considerble amount of care is required. The best fats for the purpose are tallow and coconut oil, and it is advisable to use both soda and potash in their preparation, as better lathering soaps are obtained in this way. We append a recipe by the cold process.

Tallow	50 lb
Coconut oil	10 lb
Soda lye of 71°Tw.	26 lb
Potash lye of 60°Tw.	4 lb

A little gum tragacanth may be added to promote permanence of the lathering qualities.

Medicinal Castor Oil.

1709 R. C. B., Gujranwala. Wants to know how castor oil is prepared for medicinal purposes.

The castor seeds, having been thoroughly cleansed from the dust and fragments of the capsules with which they are mixed, are conveyed into a shallow iron reservoir, where they are submitted to a gentle heat insufficient to scorch or decompose them, and not greater than can be readily borne by the hand. The object of this step is to render the oil sufficiently liquid for easy expression. The seeds are then introduced into a powerful hydraulic press. A whitish oily liquid is thus obtained, which is transferred to clean iron boilers supplied with a considerable quantity of water. The mixture is boiled for some time, and, the impurities being skimmed off as they rise to the surface, a clear oil is at length left upon the top of the water, the mucilage and starch having been dissolved by the liquid, and the albumen coagulated by the heat. The latter ingredient forms a whitish layer between the oil and the water. The clear oil is now carefully removed and the process is completed by boiling with a minute proportion of water, and continuing the application of heat until aqueous vapour ceases to rise, and until a small portion of the liquid, taken out in a vial, continues perfectly transparent when it cools. The effect of this last operation is to clarify the oil, and to render it less irritating by driving off the acrid volatile matter. But much care is requisite not to push the heat too far, as the oil then acquires a brownish hue and an acrid peppery taste. After the completion of the process the oil is put into barrels and offered for sale.

Crystallisation of Sugar.

1542 R. G. N., Trichy. Wants to learn the process of crystallising cane sugar.

The actual process of sugar boiling in a large factory may be divided into three parts : the granulation, the growing of crystals, and the bringing up to strike.

Granulation is obtained by continuing the concentration of the syrup until a supersaturated solution is formed, after which sugar must eventually separate, the crystallisation taking place in the shape of minute barely visible grains. The actual formation is usually obtained by a sudden lowering of the temperature, as by increasing the injection water, by shutting off steam or by introducing a charge of cold syrup.

The juice is concentrated to varying points, adapted respectively to whichever process of crystallisation is to be employed. These may vary from a density of 40°Be with the muscovado process, the point at which the juice leaves the copper wall, or steam pan, in a state of supersaturation, to the lower figure of 17° to 18°Be when open concentration in conjunction with the vacuum pan is employed. The usual density of the syrup, however, when it comes from multiple effect evaporates is 30°Be., corresponding to a water content of about 45 per cent.

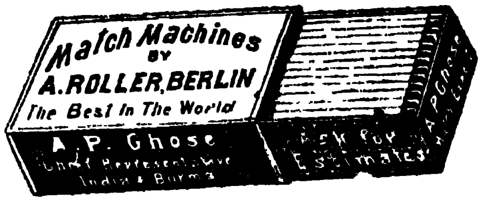
In the muscovado process the next step is to start crystallisation by cooling the highly heated syrup. This, with the ordinary process, is done by transferring it from the last vessel of the copper wall or other apparatus by which the finishing stages of concentration have been carried out, to flat rectangular tanks. The temperature is high, somewhere about 230°F. and it is this high temperature which has had the effect of preventing the crystallisation of the cane sugar during the boiling process. As the temperature falls, granulation takes place, and the cooling mass rapidly becomes a magma of fine crystals mixed with mother liquor—the molasses. A crust first appears on the cooling surface, and has to be broken as it forms, to secure uniform cooling throughout. At the end of two or three days the crystallisation is usually complete. The cooling operation is accelerated, by a process known as "oscillation." At the same time the motion involved develops a larger grain in the sugar.

Morgan Crucible Machine.

1618 M. L. D., Amritsar, Asks, "Could you describe the operations of Morgan's machinery for manufacturing crucibles ?"

Crucibles for various metallurgical purposes are generally made on an ordinary potter's wheel. But often special machines are also employed for the same purpose and for a large scale manufacture. One of these is known as Morgan's machine for making either large or small crucibles. The peculiar mechanical arrangement consists in fitting the former, or forming tool employed in the apparatus, so that in addition to being capable of an up-and-down movement, the former is free to be moved and adjusted horizontally as the crucible is being moulded, and according to the required size or thickness of the crucible.

When a crucible is to be made the frame is pulled down to cause the former to enter the plastic material, which is placed in a mould, on a revolving lathe or jigger, as usual, and when the former reaches the bottom of its course, a catch on one of the uprights secures the frame in position. The threaded rod is then turned, to cause the former to move horizontally, and spread the plastic material against the side of the mould. Finally, the back end of a lever carried on the top of the frame, and free to move backward by means of slot or otherwise, is inserted into a hole formed for the purpose, and its forward end is pressed down by hand, so that the lever bears forcibly upon the frame, and prevents all vibration or movement of the former. When the crucible is



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finished, the handle is turned to bring the former to the centre of the crucible, the lever is moved forward out of its hole, the catch released, and the frame raised up by a balance-weight. The operation is then repeated for the next crucible, and so on.

Uses of Chaulmugra Oil.

1524 M. S., Chittagong. Wants to learn the uses of chaulmugra oil.

Chaulmugra oil has long been known and used in India as a remedy for cutaneous diseases, and has lately become a drug of some importance in European practice. In the indigenous system of therapeutics the seeds and oil are both largely employed, and are as a rule administered mixed with *ghi*. They are supposed to be alternative and tonic internally stimulant when applied externally. They are principally employed in the treatment of leprosy and other skin diseases. In the Pharmacopea of India chaulmugra is recommended as an alternative tonic in cases of leprosy scrofula, other skin diseases, and rheumatism, in doses of six grains of the powdered seeed in pill three times daily, to be gradually increased till nausea is produced, or five to six drops of the oil similarly increasing the quantity. It is also efficacious against cases of phthisis and syphillis.

Chaulmugra Ointment.

The same gentleman asks if any medicinal ointment could be prepared from chaulmoogra.

An ointment, prepared by beating the seeds, deprived of their shells, into a paste of the requisite consistence, with a little ghee, or simple ointment, has been found of great service as a local application in some obstinate skin diseases.

Chrome Greens.

1762 D. C., Bombay. Requires some hints for the manufacture of chrome greens.

The modern Brunswick greens, which are made in a variety of shades, are sometimes known as chrome greens. They really consist of a white pigment as a basis usually sulphate of baryta (barytes) but occasionally also sulphate of lime (gypsum) and sulphate of lead. This is coloured green in varying intensity and depth by the addition of a blue pigment in the shape of Prussian blue, and a yellow in the guise of chrome-yellow. Four standard shades are recognised in the trade, viz., "pale" and "medium," "deep", "extra deep."

The composition of these paints vary considerably, e. g.

Barytes	75 %
Prussian Blue	1 to 6 %
Chrome Yellow	14 to 18 %

The actual ingredients employed to form these green pigments are essentially different, according as the wet or the dry method of combining them be adopted.

The following recipes will hold good for 100 lbs. of barytes forming the body of the new pigment.

MEDIUM—Wet—1½ lb. each copperas and prussiate, 12½ lb. lead acetate, 4 lb. bichromate.

DRY—30 lb. chrome yellow, 2½ lb. prussian blue.

DEEP—Wet—2 lb. each copperas and prussiate, 13 lb. lead acetate, 4¼ lb. bichromate.

Dry—30 lb. chrome yellow. 4½ lb. prussian blue.

Carbon Rod.

1276 D. P. D, Narsingpur. Writes, "Please publish the formula of carbon rod in you esteemed journal."

As carbon cannot be melted to a fluid condition it cannot be cast in a mould. But powdered carbon can be combined with a cementing substance, made into a stiff paste then moulded shaped and baked. It the grain of the article is to be close and hard, the carbon must be ground to a very fine powder. It may then be made into a paste by adding sugar syrup or treacle. This paste is next pressed into a strong iron mould so made as to be easily taken apart afterwards for the removal of the carbon articles. The mould with its carbon must then be baked at a strong bright red heat, which will carbonise the sugar and cement the powdered carbon. It may be necessary to soak the carbon again in sugar syrup and rebake until sufficiently smooth and hard.

Fish-Curry in Bengal.

1116 N. S. L., Ratnagiri. Writes, "Please let me know how fish-curry is prepared in Bengal."

Here is a simple method of preparing fish soup which forms part of the Bengali dietary. The fish, duly dressed and besmeared with turmeric paste and salt, is first gently fried in mustard oil and kept ready. Next a few pieces of vegetables are singed in a little mustard oil along with chillies, fenugreek and other spices in a pan. A quantity of water in which the following paste has been dissolved is now poured in and brought to boil. The paste referred to is obtained by braying mustard in water on a muller together with a small proportion of turmeric, cumin seed, black pepper, etc. The fish is then added and boiled until properly cooked. The required quantity of salt being stirred in, the soup is ready and removed.

Tortoise-shell Polish.

1526 S. S. T., Mergui. Writes, Please describe a method of polishing tortoise-shell articles.

Tortoise-shell articles often get dull and look dingy. To polish them dip the finger in linseed oil and rub over the whole surface. Very little oil should be used, and if the article is a patterned one it may be necessary to use a soft brush to get it into the crevices. Then rub with the palm of the hand until all oil has disappeared. The shell then feels hot and looks bright and shiny.

Removing Tattoo Marks.

1679 K. B., Poona City. Asks how to remove tattoo marks from skin.

Tattoo marks are removed with difficulty from the skin. Apply nitric acid with a pointed glass rod just sufficient to cover the stain, so as to avoid making a larger scar than useful. Allow the acid to act for about one minute and a half and until a crushed appearance shows itself. Then wash of with clean cold water. A scale will form in a few days after this treatment, containing the tattoo mark, Remove it gently. If however there be inflammation pultice and bath with warm water.

Potato Flour.

1627 S. R. L. N., Erode. Wants to prepare potato flour.

Cleanse good potatoes, boil, peel and cut them in slices. Now add to 100 parts of potatoes 4 of salt ; then dry thoroughly, and grind them to flour. Keep the product in hermetically sealed tin containers.

Accumulators.

1688 A. N. K., Madura. Asks how accumulators are made.

Originally, scondary batteries were called accumulators or storage batteries, because it seemed as if electricity was accumulated or stored up in them. Their real function is, however, to transform electrical energy into chemical energy during the socalled 'charging' ; and subsequently to reconvert this chemical into electrical energy when required.

The simplest form of secondary battery is a cell in which two lead plates dip into shulphuric acid. In a good type now in vogue the lead plates are replaced by leaden grills or gratings. Each hole in the grill is filled with a cake of compressed oxide of lead, the holes being shaped so as to prevent the cakes from falling out. Instead of a single pair of plates, a more complete cell has fine grills united at the top by a lead bar to which the negative terminal is attached. The effect is the same as that of a pair of plates of five or six times the size of a single one and hence the cell has a very low internal resistance. The liquid in the cell is dilute sulphuric acid.

Film Cements.

1640 D. I., Patna. Requests us to publish a formula of film cement.

Film cement may be easily made by adding to 1 oz. of the amyl acetate a strip of film about 6 inches long, clean and free from emulsion. First clean the film-piece thoroughly, then cut it up and place in the solvent. It soon dissolves and the solution is ready for use. Apply with a camel-hair brush.

Another good cement, but one that dries more slowly, is obtained by dissolving a six inch strip of film in a mixture of ½ oz. of acetone and ½ oz. of amyl acetate. If too thin, add more celluloid ; if too thick, add more solvent.

It will be apparent from above that the rejected films which are allowed to waste can be utilised by converting them into cement and thus a small industry built up.

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British Vinegar.

1822 P. C. C., Lucknow. Asks how British vinegar is prepared.

The malt vinegar is known as British vinegar and is manufactured as follows. A mixture of malt and barley is mashed with hot water and the resulting wort fermented, as in the common process of brewing. The liquor is then run into barrels, placed endways, tied over with coarse canvas, and arranged side by side in darkened chambers, moderately heated by a stove, and freely supplied with air. Here it remains till the acetous fermentation is nearly complete, which usually occupies several weeks. The newly formed vinegar is next run off into two large tuns, furnished with false bottoms, on which some 'rape' is placed. The green twigs or cuttings from vines are known as 'rape'. One of these vessels is filled wholly and the other is filled three quarters. The fermentation recommences, and the acetification proceeds more rapidly in the latter than in the former tun, and the liquor it contains consequently matures the sooner. When fit for sale, a portion of the vinegar is withdrawn from the smaller quantity and its place supplied with a like quantity from the full tun, and this in its turn is refilled from the barrels before noticed. This process is carried on with a number of tuns at once. which are all worked in pairs.

Extraction of Mercury.

1628 M. P. S., Paungde. Please describe methods of extraction of mercury from cinnabar, arsenic, etc.

(a) From cinnabar.

Two general methods are available on a large scale for the reduction of cinnabar. The one depends on the oxidation of heated cinnabar by air, mercury vapour, and sulphur dioxide being formed. In the other the cinnabar is heated with lime in a vessel from which air is excluded, calcium sulphide and sulphate are formed, and mercury vapour is set free : instead of lime, iron in the form of smithy-scales can be used. In every case the reactions take place at a temperature exceeding the boiling point of mercury, so that the condensation of the vapour is an essential part of the process.

(b) From amalgams.

Mercury may be readily separated from its combinations with other metals, except antimony and arsenic, by volatilisation at a low temperature and the mercury determined by the loss of weight. In the case of oxidisable metals the volatilisation must be effected in a current of hydrogen gas.

Mercury may be separated from antimony and arsenic by pricipitating the mercury with yellow ammoniac sulphide, the antimony sulphide being soluble in that liquid.

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Hair Curling Lotion.

1093 K. S., Madras. Wants recipes for hair curling lotion and rose face powder.

Potash (Pure).	7 gms.
Ammonia	3½ ,,
Glycerin	15 ,,
Alcohol	12 ,,
Rose Water	550 ,,

Make into a mixture which may be perfumed with any scent.

First wash the hair with soap to remove the grease and then apply the above lotion. Make the hair wavy in the wet : tie it up. The hair will curl on drying.

Face Powder.

A face powder of rosy hue may be prepared as follows.

Starch	1000 gms.
Carmine	20 ,,
Otto Of Rose	15 ,,
Otto of Khus Khus	15 ,,
Sandal Oil	15 ,,

Arrowroot Biscuit.

1869 S. B. M., Calcutta. Wants a recipe for arrowroot biscuit.

Arrowroot	6 oz.
Butter	6 ,,
Flour	8 ,,
Sugar	8 ,,
Eggs	Five

Sift the flour thoroughly and powder the sugar finely. Beat the butter to a cream ; add the sugar and pour in the yolks of the eggs. Now mix together the flour and the arrowroot ; sift again and then incorporate the mixture into the butter. Mix and work thoroughly Whisk the whites to a froth ; add to the above mixture and knead into a dough. Butter the baking tin and spread on it small portions of the dough and bake in a moderate oven.

TWO IN ONE.

Ask for a copy of prospectus and read Table No. 5.

The Britannia Life Assurance Company Limited.

37-39. Forbes Street,
FORT BOMBAY.

Town and District Agent Wanted.

Removing Paint from Wood.

1742 K. K. K., Surathkal. Wants to know how to remove paint from wood.

It often happens that the surface to be painted is already covered with oil paint. It is then required that the coating should be either removed or rubbed down smooth before applying the new. When the thickness of the old coat is not great, rubbing down, accompanied by a careful scraping of blisters and defective parts will suffice. When the thickness of the old paint necessitates its removal, it may either be burned off, or softened by a solution of caustic alkali and afterwards scraped. The burning process is the most effective, and leaves the wood in a fit condition to receive the fresh coat of paint ; but it is not applicable in the case of fine mouldings. When caustic potash or soda is used, the paint is left in contact with it for some time, when the linoleic acid of the oxidised linseed oil becomes saponified, and can easily be scraped or scrubbed off the surface of the wood. Whenever an alkali is employed, it is of the greatest importance that the wood should afterwards be thoroughly washed several times with clean water, in order to remove every trace of the solvents. Any soda or potash remaining in the pores of the wood would not only retain moisture and cause blistering, but would also have an injurious action upon the vehicle of the paint subsequently applied, and in many cases upon the pigment itself.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of INDUSTRY are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

1002 K. S., Kandy. First of all you may prepare coffee powder according to the given process, then make tablets from the powder. Coffee powder is prepared by mixing condensed milk with a very concentrated essence of coffee and evaporating at a low temperature (in vacuo if possible), until the mixture acquires the consistence of candy. Then it should be powdered and then made into tablets.

1221 H. L. C, Lahore. In purifying til oil filter through filtering paper or through two or three-fold flannel cloth. Used-up blades of safety razor may be sharpened with special appliances. Formula of tooth paste appeared in April 1924 issue.

1276 T. B. D., Ranchi. General process of preparing different kinds of fruit syrup appeared in January, 1923 issue of Industry. Formulas of "taralalta" appeared in August 1924 issue. Formula of washing soap will be found in May 1924 issue.

1302 A. T. N., Bangalore. You may read Rubber Hand Stamps by Mr. T. O'conor Sloane to be had of Chakravertty Chatterjee & Co. Ltd., 15, College Square, Calcutta. Rubber stamp making outfits may be had of Messrs S. C. Dutt & B. K. Dutt, 100, Durga Charan Mitter Street, Calcutta.

1321 M. C., Drug. Please refer to No. 1302.

1326 N. V. R. K. R., Nagaram. Process of capping bottles will be found in June 1923 issue.

1354 M. R. M., Doraha. What do you mean by improving raw coal tar? Please explain your intention.

1356 B. B. L., Ambala. The construction of a secondary battery is detailed elsewhere. A dynamo must be installed to drive fan in countryside. For magic snake refer to "Novelties" page. Formulas for ink and varnish have already appeared.

1372 L. G. D., Dharwar. An article on paint and its ingredients and tools will appear in an early issue.

1373 L. R. L. S. C., Lansdowne. Formula of python egg appears elsewhere in this issue.

1386 T. L. N., Ongole. For razor handles of celluloid you may enquire of the Jessore Comb & Button Factory, 20-1, Lal Bazar Street, Calcutta. As to the use of your colour you may consult the book on indigenous dye by Sir P. C. Roy to be had of The Book Company, 4-4A College Sq., Calcutta.

1396 J. M. S., Murshidabad. Books you requre may be had of Kamala Book Depot Ltd., 15, College Square, Calcutta. Other queries will be dealt with in an early issue of Industry.

1412 P. D. S., Bombay. A series of articles on dry cleaning appeared in November, and December of 1919 and Jan. and March of 1920 issues of Industry.

1548 M. A. R., Kymore. Fancy goods may be supplied by Heinrich & Schlesier, Roprhofsgasse 14, Dresden, Germany; C. E. Ganger, Alter Steenweg 49, Hamburg, Germany; Alkan Henry & Co., 377 Fourth Avenue, New York; Dreyfuss Gustav, 76, Dorrance Street, Providence, Rhode Island and Pacific Novelty Co., 41E 11th Street, New York; last three of U. S. A.

1550 R. P. G., Umaria. An article on cigar and cigarette manufacture appeared in September issue of 1920. Fifty thousand rupees will be required for starting cigar and cigarette manufacture. For starting soapfactory on a small scale Rs. 5,000 will be sufficient. Cardboard boxes may be had of Kundu

& Das, 20, Gour Laha Street ; Calcutta Fine Art Cottage, 76, Dharamtolla St. and H. L. Sett & Sons, 8, Nilmoney Mitter Street, P. O. Beadon Street ; all of Calcutta. Chalk pencil and blanco moulds may be made by a local blacksmith as per order.

1551 R. B. S., Patna City. Hosiery goods are imported by D. L. Brij Lal & Co., 193-2, Harrison Road and E. B. Bros., 11, Dharamtallah Street ; both of Calcutta. Requires services of a chemist who can advise him in making boot polish and fountain pen ink.

1552 C. D., Hathras. Oil engines in the long run are more costly than steam engine.

1553 L. S., Parlakimedi. For information regarding technical education you may write to the Director of Industries of your province. Washing soda may be had of Calcutta Chemical Co. Ltd., 35-1, Panditia Road, Ballygunge, Calcutta. Wants to buy potatoes, cabbages, nuts and fruits. The following are some of the cloth merchants of Calcutta ; (1) Bulakidas Chhaganlal, 50, Cross Street ; (2) Bharat Weaving Co., 87, Cross Street ; (3) Haribux Durga Prasad, 182, Cross Street and (4) Dacca Trading Corporation, 2-, Cornwallis Street. Stationery articles may be bought of Dass & Co., 60, Sikdar Bagan Street and Nilmony Halder & Sons, 106, Radha Bazar Street ; both of Calcutta. For the address of Imigration office in India write to The Labour Office, Government of Bombay. Other enquiries being in the nature of an advertisement should not be dealt with in these pages.

1554 M. O. K., Bombay. Consult a physician.

1557 V. S., Thakurdwara. Your query is unintelligible.

1558 S. A. R. M., Raxaul. You may use bleaching powder for bleaching cotton thread. Bleaching powder is available in the market in large quantity. For clarifying sugar filter through bone charcoal. For sugar manufacture you may go through Bulletin No. 19 on Improvement on the Native Methods of Sugar Manufacture by Mr. S. M Hadi to be had of Government Printing, U. P., Allahabad. You must use polishing cone for giving lusture to rice, Polishing cones may be had of Marshall & Sons, 99, Clive Street, Calcutta.

1559 V. I. & Bros., Kottayam. Wants to know whereabouts of B. A. H. P. Mohemmed & Co. of Moulmein.

1560 V. P. K C., Coimbatore. Process of gilding silverwares appeared in November, 1922 issue.

1561 A. D. P., Poona City. Panini Office, Allahabad has got large stock of Sanskrit books. Liquid dipilatory may be had of Bathgate & Co., 17, 18 and 19, Old Court House Street and Smith Stanistreet & Co. Ltd., 9, Dalhousie Square East ; both of Calcutta.

1562 S. N. N , Fatehgarh. Please refer your query to the Director of Commercial Inteliigence, 1, Council House Street, Calcutta.

1563 J N. B , Kharagpur. Formula of toilet powder appears elsewhere in this issue. An artcle on boot polish appeared in June, 1923 issue.

1567 M J. D., Bombay. Please refer your query to the Director of Agriculture of your province.

1569 B. D. N., Darbhanga. Tincture iodine is prepared by dissolving 2½ oz. of iodine in 1 quart rectified spirit.

1570 S. B., Delhi. Fancy goods are imported by Messrs Alex Brault, 7-1, Wellesley Place, H S. Hasenali, 38-1, Canning Street and Singh Sarkar & Co., 125, Harrison Road ; all of Calcutta. Envelope making machine may be bought of Oriental Machinery Supply Agency Ltd , 20-1, Lall Bazar Street, Calcutta. For foreign addresses consult Kelley's World Directory.

1573 T. P , Madras. Please go through the notice at the beginning of these columns.

1574 S. P. P., Tachanallur. Thread balling machines may be had of Oriental Machinery Supply Agency Ltd. 20-1, Lall Bazar Street, Calcutta.

1575 M. G. D., Mhow. Your enquiry appeared in the last issue.

1576 K. B. K., Bassein. Lozenge machineries may be supplied by H. Lichtenberg, Magdeburg—N1 28, Germany. An article on English confections appeared in September 1923 issue.

1578 L. A., Harda. Of course, you may use commercial pearlash in removing oil and grease marks. Write direct to the advertiser.

1579 B. N. S., Muzaffarpur. Tin sheets may be had of Kanay Lall Dhur, 11, Swallow Lane and Hem Chandra Chunder, 13, Swallow Lane; both of Calcutta. Aluminium sheets may be had of Indian Aluminium Co. Ltd., 32, Triplicane, High Road, Madras. German silver ingots may be supplied by Syed Abdul Kader, 144-5, Harrison Road, Calcutta. Iron sheet may be bought of Anandji Haridas, 20, Darmahatta Street, Calcutta. Sheet metal machines may be supplied by Taylor and Challen Ltd, Birmingham, England. For the required machineries enquire of Messrs John King & Co., 40, Strand Road, Calcutta and Heatly Gresham Ltd., 6, Waterloo Street, Calcutta.

1580 E. M. T., Pandharpur. We cannot venture any opinion about multiple husker over and above what has been given in the prospectus, It will be advisable for you to see the working personally. Regarding canning you are referred to April, May and June 1924 issues of INDUSTRY where a series of articles on canning will be found.

1581 B. M. S., Chomu. We do not deal in any article. For the required meter you may enquire of the following cycle dealers of Calcutta: S. N. Bhattacherjee, 5, Dharamtolla Street; Imperial Cycle add Sporting Stores, 75, Harison Road and M. L. Shaw, 5-1, Dharamtolla Street; all of Calcutta.

1583 P. C., Jaipur City. For rubber soles and red lamp cigarettes enquire of Messrs B. Bysack & Co., 14, Uttarpara Rd., Cossipore, Calcutta.

1585 N. V. S., Triplicane. To dispose of the stamps you have to advertise in some periodicals.

1589 P. G. N. B., Pandharpur. Tea may be had of Mukherjee Bros. & Co., 17-19, Shambazar. Bridge Road; Ashutosh Dey & Co., 3-1, Mango Lane and Bhattacherjee & Co., 64-1, Cornwallis Street; all of Calcutta. Paper may be had of Ghosh Brothers, 63J, Radhabazar Street, Calcutta. Stationery articles may be bought of Dass & Co., 60, Sikdar Bagan Street, and Nilmoney Halder & Bros., 106, Radhabazar St., both of Calcutta. Tin boxes may be supplied by Bengal Tin Box Manufacturing Co., 79, Raja Nobo Kissen Street, Calcutta. If you take agencies you will get only the commission while in direct trading you will get the entire profit but then the risk will also be yours. As regards free advertisement we cannot suggest any means.

1590 V. S. S., Berhampore Imitation gold and silver threads may be had of Amitava Ghosh, 33, Canning Street, Calcutta. Wants to know the address of Panchanandas Chunilal of Calcutta.

1591 R. S., Parlakimedy. You may enquire of The Secretary, Education Department, Government of Burma.

1592 B. B. L., Ambala. Process of refilling dry batteries will be found in June 1923 issue of INDUSTRY. Formula of rubber stamp ink appeared in July 1923 issue. For different colours in

Cheapest House for
Sporting Goods
Silver Medals, Cups & Shields.
Fine Silver Medals in Velvet lined cases.
Rs. 3-12 Each.
Largest Stock & Variety
Illustrated Lists Free.
Carr & Mahalanobis,
CHOWRINGHEE CORNER, CALCUTTA.

pyrotechnics please see elsewhere in this issue. A good recipe of furniture varnish was published in November, 1923 issue. Formula of cinema film cement appears elsewhere.

1593 B. B. C., Muzaffarpur. Vinum grapes may be had of Messrs Martin and Harris, 8, Waterloo Street, Calcutta.

1594 V. M. S., Cherrapunji. Please refer your query to the Director of Agriculture of your province.

1595 P. B, Triplicane. Knitting machines may be had of Indo-Swiss Trading Co., 27, Pollock St., Calcutta.

1596 V. R. M. S., Bellary. Electrical goods may be had of Messrs Mc. Lawrie & Co., 17, Ezra Street, Calcutta. Electrical goods may be supplied by Franz R. Conrad, Gloganer Strasse, 19-21, Berlin S. O. 36. Germany. Films may be had of Pathe Cinema Ltd. Pathe Blds., Ballard Estate, Bombay on hire system. Cinema films may be supplied by Ausco Co., Binghamland, New York, U. S. A.

1597 R. B. L., Roorkee. Capsules may be had of B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta. Cardboard boxes may be had of Calcutta Fine Art Cottage, 76, Dharamtollah Street, Calcutta.

1598 T. W. B., Lyallpur. Yarns may be had of Bhukhandas Govindji & Co., 48, Medows Street, Bombay; M. A. Ahmad Batcha Saib & Co., 16-17, 2nd Line Beach, Madras and Chettle Holt & Co., Ltd., 9-10, Moore Street, Madras.

1599 J. R. D. K, Hafizabad. Wants to be put in touch with dealers in castor cake.

1600 L. M. B., Lucknow. For industrial books enquire of Chakravertty Chatterjee & Co. Ltd., 15, College Square, Calcutta. The required address is not known to us.

1602 M. J. S., Kapadvang. If you sprinkle caustic soda on the floor rats will not come there.

1603 J. N. C., Badam. Cycles may be supplied by Baedekers-Handelsgesells-chaft, Hamburg, Germany; B. S. A. Cycles Ltd. 27 & 28, Pall Mall, London S. W. 1 and Raleigh Cycle Co. Ltd., 41, Holborn Viaduct, London E. C. 1.

1604 S. R. S., Kumbakonam. Process of silvering mirror apppeared in March 1923 issue.

1605 S. B. S., Bogale. Your query is outside the scope of INDUSTRY. You may however write to the Registrar of Rangoon University.

1606 S. S. M., Bhadravati. Envelope making machineries may be had of Oriental Machinery Supply Agency Ltd. 20-1, Lall Bazar Street, Calcutta. For printing machines enquire of K. Banerji, 133, Canning Street, Calcutta who will supply you with estimates.

1607 S. K. M., Calcutta. There is no depilatory known which removes hair permanently.

1611 K. F. G. V., Darwar. Match making machines may be bought of Bhawani Engeering & Trading Co., 122-1, Upper Circular Road; Ghatak & Co., Rai Bahadur Road, Behala, and Bengal Small Industries Co., 91, Durga Charan Mitter Street; all of Calcutta.

1612 M. G. K., Nagpur. After cleaning with a piece of cloth and some turpentine oil apply white shoe polish.

1612 (A) D. N., Calcutta. Recipe of lemonade powder appeared in September 1921 issue. Adding some adhesive to this powder tablets may be made in a tablet making machine. Formula of tea tablets appeared in July 1923 issue. Formulas of syrup tablets and soda-water tablets are not known.

Bombay Deshi Oushadhalaya.
Factory & Dispensary.
ASK FOR ANY FEVER
AGUE KILLER.
1 Phial As. 8. Doz. Rs. 5.
and our other popular remedies. Can be had everwhere at Cheapest Rate.
Pearl & Co.,
Victoria Garden, Bombay.

1613 T. G. T. C., Cocanada. Fancy goods may be supplied by Adachi T. N. Kaisha 43, Nishimachi, Kobe and Hiras Shokai 153, Yamashitacho, Yokohama; both of Japan. Electrical novelties may be supplied by the Nippon Densen Kaisha Ltd., Mukjima, Tokyo, Japan.

1614 T. C. T., Poungoo. Consult a watch repairer.

1616 K. N., Bombay. The invention you refer to is still in its experimental stage, hence its further particulars are not known.

1617 A. K. G, Morar. Thermo flask may be had of Whiteaway • Laidlaw & 'Co, Chowringhee, Calcutta. Harmonium and other musical instruments may be bought of Dwarkin & Sons, Dalhousie Square and The Lucky Flute Co., 3, Ramchand Ghosh Lane, P. O. Beadon Street, both of Calcutta. To dispose of your used stamps advertise in some periodical like INDUSTRY.

1619 S D. K., Bankura. For rice mill refer to April 1924 issue of INDUSTRY which deal exhaustively with rice industry of India. There is no Bengali translation of INDUSTRY. Desires to be put in touch with rice exporters of Madras Presidency.

1621 S. S. R., Coimbatore. Formula of Bengal matches is not known.

1623 J. M. P., Nagpur. Formulas of pain balm appeared in December 1922 issue. Goldsmiths use shellac and not artificial shellac as you mention.

1625 M. N. R., Vizianagram. An article on the construction of dry cell battery will clearly explain your difficulty.

1626 P. A. S., Alleppey. Please refer your query to the Chief Inspector of Mines in India, Dhanbad P. O., Manbhum.

1629 P. V. R., Tuni. You may use mango wood which will be elastic no doubt but the colour will be slightly yellowish. Further you may go through Possibilities of Match Industry in Bengal by Mr. A. P. Ghosh to be had of Bengal Secretariat Book Depot, Writer's Building, Calcutta.

1631 A. A., Patna. Machines for small industries may be had of Oriental Machinery Supply Agency Ltd., 20-1, Lall Bazar Street; Ghatak & Co., Rai Bahadur Road, Behala; Calcutta Industries Ltd., 71, Canning Street and Bengal Small Industries Co., 91, Durga Charan Mitter Street; all of Calcutta.

1632 I. G. W., Firozabad. Glass wares are manufactured by Bengal Glass Works Ltd., 39-1, Canning Street and Calcutta Glass & Silicate Works Ltd., 101, Cornwallis Street; both of Calcutta.

1633 T. S, Maruter. Put the green ginger regularly, every night and morning for a fortnight, into fresh boiling water. Remove the outside skin with a sharp knife boil it in water until it is quite soft and slice it in thin slices. Make ready a syrup of 1 lb. of loaf sugar to ½ pt. of water, clarify it and put the ginger into it. Boil until it is clear. The whole procedure will take 14 days.

1634 G. V. S., Conjeeveram. Maranta arundinacea is a plant from the root of which arrowroot is manufactured. Desires to buy kiranji seeds, kajula powder, jabra seeds and pista.

1635 A. L., Harsora. For "dhuning" machines write to Khadi Pratisthan, 15, College Square, Calcutta.

1636 P. G, Tenali. Messrs A. Paul & Co., 232A, Upper Chitpur Road, Baghbazar, Calcutta may supply you the required tools.

Weigh Yourself

After using **Amrita Kundu Salsa with Gold** for only 2 weeks, you will find that your weight has much increased. It **Purifies the blood**, and increases and strengthens the growth of the blood by creating blood corpuscle. It destroys the **mercurial & syphilitic poison.** Price 1 phial Re 1. Postage 8 as. 3 phial Rs. 2-8, Postage 15 as Catalogue free on application.

KAVIRAJ

Dasharothy Kaviratna.

Dawn Lane, Hatkhola Post, Calcutta.

1637 C S N. N., Cuttack. 'Newar' is mainly used in curtains to form borders. Wishes to be introduced to wholesale dealers in 'niwar'.

1638 B. P. J. L., Banda Oil mills may be had of Messrs Ghatak & Co., Rai Bahadur Road, Behala, and Burn & Co., 7, Hastings Street ; both of Calcutta. Oil engines may be bought of Alfred Herbert (India) Ltd., 19, British Indian Street, Calcutta.

1639 C. V. C., Ahmedabad. Match machines may be had of Bhowani Engineering and Trading Co., 122-1, Upper Circular Road ; Ghatak & Co., Rai Bahadur Road, Behala and Bengal Small Industries Co., 91, Durga Charan Mitter Street ; all of Calcutta. The following are some of the match manufacturers : Prasanna Match Factory, Deori Dacca; Amrit Match Factory, Bilaspur, Kota ; Guha's Lucifer Works, 23J, Paik Para Raja Manindra Road. Paikpara Road, Calcutta ; C. A. Latif, 15, Paikpara Road, Calcutta ; National Match Factory, Canal East Road, Ultadanga, Calcutta ; Provat Match Factory Domjur, Howrah and Obeum Match Factory, Rajgangpur, Chaibassa. You may consult Mr. A. P. Ghosh, 42, Beniapukur Road, Entally, Calcutta for expert advice on match manufacture. For hints on match manufacture you may go through September 1923 issue of INDUSTRY.

1641 T. D. V. L., Multan City. The following are some of the enamellers of U. S. A :—Columbian Enamel and Stamp Co , Ferre Hante, Indiana ; Lafayette Stamping & Enamelling Co., 303, Fifth Avenue, New York ; New England Enamelling Co., New York and Excelsior Enamel., Co., New York.

1642 O. I. E. C,, Gujrat. Laces may be had of K. D. Havuram & Co., 10A, Linsay Street, Calcutta. Norman & Co., Indo-Ceylon House, Samavaya Mansion, 6, Corporation St., Calcutta and T. R. S Rajam & Co., 7-16, Lukmudass Street, Park Town, Madras. Hosieries, etc., may be had of M. Allabux & Co , Narsinha Mansion. Carnac Road, Bombay ; R. K. Motishaw & Co., 11, Hemmum St., Fort, Bombay ; Abdul Khalique & Co., 11, Colootola Lane, Calcutta ; Drapery Store, G 14, Municipal Market, Calcutta Bachalal Ismail, Elphinstone Street ; Karachi ; R. B Master & Co , Nusservanji Co's. Blds., Karachi and Ragha Mull & Sons, 2, Fort Road, Delhi. Knitting yarns may be bought of E. B. Bros. & Co., 11, Dharamtola Street, Calcutta. Celluloid bangles may be supplied by F P. Nalladaroo & Co., 50-1, Canning Street and S. Abdul Aziz, 52, Canning Street : both of Calcutta. German lanterns may be had of Messrs Singh Sarkar & Co., 125, Harrison Road, Calcutta. Pearl and buttons may be bought of B. L. Mitra & Bros., Barpara, Dacca and Narayanganj Button Manufacturing Co. Narayanganj, Dacca Other addresses you require will be found elsewhere in these coloumns.

1643 R. D. K., Chumair. For a suitable job you may write to Service Securing Agency, Delhi ; Employment Bureau, Kirloskar Theatre, Poona City and Service Securing Agency, 174, Hornby Road, Fort, Bombay.

1644 P. P. N , Rajahmundry. For ammunition enquire of Messrs K. C. Biswas & Co., 1, Chowringhee Road, and D. M. Biswas & Co., 5, Dalhousie Square, East ; both of Calcutta.

1645 J. R. R., Rawalpindi. Answers to your queries appeared in the last issue.

1646 A. H., Jacobabad. Formula of rubber stamp ink appeared in July 1923 issue of INDUSTRY. Your other query is engaging our attention.

1647 S. S. G , Poona. For ink please go through November 1922 issue of INDUSTRY in which, you will find an article on Ink Manufacture. Formula of fountain pen ink will be found in August 1924 issue.

1648 M. D. G , Jamadoba. We are requiring whether cattle food can be prepared from sawdust.

1649 P. C. R., Sirsa. Watches may be had of Anglo-Swiss Watch Co., 6 & 7, Dalhousie Square, East ; James Murray & Co., 12, Government Place, East and West End Watch Co., 13 & 14 Dalhousie Square ; all of Calcutta.

1650 P. C. G., Patna. For scented cards enquire of Messrs Sikri & Co., 55-8, Canning Street, Calcutta.

1651 L. D. D., Patna. Tablet making machines may be had of Calcutta Industries, Ltd., 71, Canning Street, Calcutta.

1652 P. D., Dacca. Wants addresses of merchants of Federated Malaya States. Will any reader of INDUSTRY of that place give him the addresses ?

1654 M. T. A , Srinagar. Hosieries may be supplied by Messrs Wheeler Genz & Co., Victoria, Hong Kong. Hosieries such as underwears, stockings, etc. may be supplied by Horikawa Shoten Ltd , 10, Nichome, Horcho, Nihonbashi-ku, Tokyo ; Imura & Co., 28, Nakase-machi, Atsuta, Nagoya and K Ogura & Co , 3, Itchome, Koamicho, Nihonbashi-ku, Tokyo ; all of Japan. For ink-pots enquire of Seitaro Arai, 11, Itchome, Onoecho, Yokohama ; Choya & Co. Ltd , 19, Nishigashi, Nihonbashi-ku, Tokyo and Chugai Shoko Kabushiki Kaisha, Tosabori, Osaka ; all of Japan. Porcelain wares may be supplied by Adachi Y. M. Kaisha, 43, Nishi-machi, Kobe ; Seitara Arai, 11, Itchome, Onoecho, Yokohama and The British Trading Company, 15, Ginza Nichome Kayabashi-ku, Tokyo ; all of Japan. For needles enquire of Mahomedally Jaferje, 37-4, Canning Street, Calcutta. Hosieries are imported by S. A. Khalique & Co., 11, Colootola Street, Calcutta.

1656 B. N. S., Holenarsipur. To manufacture mercerised yarn and to dye the same on a large scale you shall have to engage the services of a practical expert. Mere book knowledge will not suffice.

1657 L. U. S., Ankola. For sizing and warping machine enquire of Bros. Partner & Co , 35, Ezra Street, Calcutta and H. M. Mehta & Co., 123, Esplanade Road, Fort, Bombay. The above firms will furnish you the necessary information.

1658 V. T , Muzaffarpur. You will learn the utility of collecting stamps from articles on the subject appearing in November 1921 issue.

1659 T. K., Tunukur. Addresses of match machine dealers will be found elsewhere in these columns.

1660 K. V. N., Trichinopoly. The report you require may be had of Central Book Depot, 8, Hastings Street, Calcutta. Your other queries are engaging our attention.

1661 K. R. J., Moradabad. Hardwares you require may be bought of Messrs Subal Chandra Dutt & Sons, 208 Harrison Road, Monohar Das Chuck ; H. K. Mukherjee & Co., 41, Strand Road and Balmer Lawrie & Co., 103, Clive Street ; all of Calcutta. German hurricanes may be bought of Singh Sarkar & Co., 125, Harrison Rd., Calcutta.

1662 K. L. M., Salem. Your letter has already been replied by post.

1663 S. D. M , Delhi. Wants to be put in touch with dealers in mould used in wax toy making.

1664 V. E. W., Anradhapura. Formula of vegetable butter appeared in January 1924 issue. Books on motor engineering may be bought of Chakravertty Chatterjee & Co. Ltd., 15, College Square, Calcutta. No such address is known.

1665 S. P. Y., Ahmedabad. Refer to No 1654.

1666 T. V., Masulipatam. Recipes of snow cream appeared in July 1924 issue. For pomade see elsewhere in this issue.

1667 M. A. M., Sibganj. For starting business with small capital you may go through the New Idea Columns of INDUSTRY. Envelope making is not so profitable concern. Envelope making machines may be had of Oriental Machinery Supply Agency Ltd., 20-1, Lall Bazar Street, Calcutta. Stockings or gournsey manufacture cannot be started with so small a capital. However for machnies requried and other allied information write to Economic Hosiery Mills Ltd., Dharamtola Street, Calcutta.

1668 A. H. U., Lashkar. Rubber baloons may be bought of Ali Mohamed Akbar Ali, 22-1, Lower Chitpur Road, Calcutta.

1670 N. B. P., Bombay. For repairing fountain pens write to Hilton & Co., 109, College Street, Calcutta.

1671 G. M. D., Satara. You may read good books on ink industry otherwrise you will have to engage an expert. As regards pain balm Amritanjan is a patent article hence its formula is not known. However you may try the formulas that appeared in December 1922 issue of INDUSTRY.

1673 U. J. P., Ahmedabad. Oil of pennyroyal may be had of Messrs B. K. Paul & Co, 1-3, Bonfield's Lane, Calcutta.

1675 S. I. H. U, Delh. Silk yarn may be had of Home Industries Association, P. O. Kamakhya, Gauhati and Dass Talukdar Agency, Strand Road, Gauhati; both of Assam.

1676 L. S. R. R, Jullundur. Almonds may be supplied by Bergada Ramon, Valls, Spain; La Exportadora Andaluza, Almeda Wilson, 20 Malaga, Spain; Lo Magro Vincenzo, Syracusa, Italy and Mauro Ant. Vittoria, Italy. To communicate with any party write him by number and initials under care of INDUSTRY when your letters will be duly redirected. You may go through Ubersee Post, 10, Solomonstrasse, Leipzig, Germany.

1680 A. S. C., Ludhiana. Packing papers may be had of Ghose Bros., 63J, Radha Bazar Street and Dutt Mukherjee & Co., 31, Jackson Lane; both of Calcutta. The managing agents of Bradbury Mill Ltd., are Currimbhoy Ebrahim & Sons, 24-26, Vithalwadi, Kalbadevi, Bombay. Other addresses you require appear elsewhere in these columns.

1681 M. P. G, Jaipur City. You may have the medicine registered by P. Lodge & Co, Post Box 6772, Calcutta. Glass bottles may be had of Bengal Glass Works Ltd., 39-1, Canning Street, Calcutta.

1682 P. G. S, Amalaparm. Yarns may be had of East & West Trading Co., 16, Bonfield's Lane, Calcutta.

1683 M. R., Rohtak. Article on *bidi* making appeared in May 1922 issue.

1684 B. M., Azimganj. You may learn motor mechanics including driving at Indian Automobile Institute, 75 & 76, Bentinck Street, Calcutta.

1685 N. V. K., Madras. Bitterness of neem oil cannot be removed.

1686 K. N. K., Bangalore. Desires to buy bear's fat.

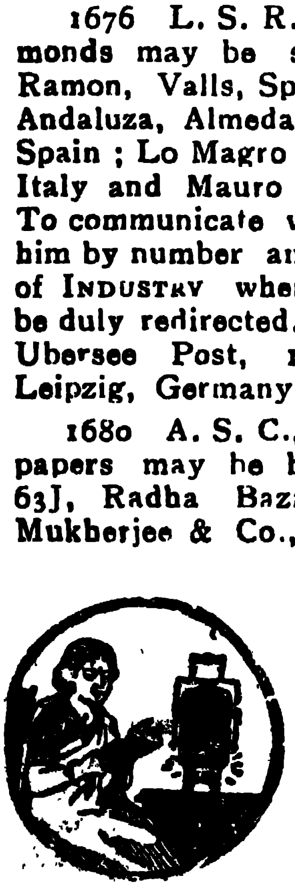
1687 A. M. G. S., Ponani. Carbide lamps of various shapes may be had of K. C. De & Sons, 96 Lower Chitpur Rd., Calcutta.

1690 K. V. S. V., Sattur. Proper scents for adding to tobacco may be obtained from P. Mukherjee & Co., College St. Market, Calcutta.

1693 K. B. U, Sholapur. You may write to Calcutta Share Syndicate Ltd., 2 & 3, Lall Bazar Street, Calcutta for particulars regarding share business in Calcutta. You may borrow money on easy terms from any bank. You may consult a physician. You may organise a limited company, for starting a cotton mill. You may go through Commerce, 6, Mission Row, Calcutta.

1694 P. L. B., Bombay. Boil some lemon leave in the rancid ghee; bad smell of the ghee will then be removed to a certain extent. Other processes are not known.

1695 G. M. C., Bombay. You will learn everything about the mauufacture of essences from the article on perfumery published elsewhere. Several methods



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Belgaum, M.S.M. Ry.

of preparing jellies have already appeared. As your former letter could not be traced in the Office you may repeat your queries.

1697 A R. K, Savda. For new pattern charka write to the Secretary, Khadi Pratisthan, 15 College Square, Calcutta.

1698 V L K, Srinagar Can supply apricot kernel.

1699 J M C, Naini Tal. Formula of lithographic ink appeared in July 1924 issue. An article on calico printing appeared in December 1922 issue of INDUSTRY. Other queries are receiving our attention.

1700 S A H., Bombay. An article on enamelling ironware will appear in an early issue

1702 R. S S, Moradabad To correspond with any querist you are to address the party by number and initials under care of INDUSTRY when your letter will be duly redirected to the party Process of making artificial asafoetida appeared in the July (1923) issue of INDUSTRY Methods of waterproofing cloths will be found in the July (1922) issue.

1703 V M S, Cherrapunji. The commercial process of extracting iron from ores is complicated. For methods you can consult any text-book of chemistry or any work on metallurgy to be had of Messrs Chakraverty Chatterjee & Co, 15 College Square, Calcutta.

1705 C. S. P, Jalgaon. Methods of distempering colours appeared in the last August issue

1706 V V. S, Bezwada. Celluloid sheets may be had of 'Mitsui Bussan Kaisha & Co, Central Bank Bldgs, Calcutta. Celluloid is soluble in amyl acetate.

1708 D. P. S, Bans Bareilly. Wants to be introduced to the manufacturers and agents of 'red lamp' and 'umbrella' cigarettes.

1710 B. P, Bombay. Here follow a list of foreign journals. Swiss Exporter, Chamber of Cemmerce, Berne, Switzerland ; La Vie Techniqueet Industrielle, 18 Rue Seginer, Paris ; Manchester Guardian Commercial, 43 Fleet Street, London E C. 4 ; Ubersee Post 10 Salomonstrasse, Leipzig, Germany ; Norwegian Trade Review published by the Trade Intelligence Bureau of Norway, Christiania, Norway ; Canadian Export Pioneer, 110 St Martin's Lane, London W. C. 2 ; Commercial America, 34th Street, blow Spruce Philadelphia, U.S A : The Empire Mail, 212 High Holborn, London W. 4. The Czecho-Slovak Trade Journal, P. O. Box 476, Prague, Checho-Slavakia. The Journal of Commerce, Garaers City Press, Gardenvale Quebee, Canada and Industrial and Labour Information publishen by the International Labour Office Geneva, Switzerland. The under-mentioned firms carry on mail order business : M. Seth & Co., 71-1 Sukeas Street : Singh Sarkar & Co, 125 Harrison Road ; both of Calcutta.

1711 R C. V., Amalner. See no. 1710 Improved *charkas* may be had of Manomohan Library, 202 Cornwallis Street, Calcutta. Steel Slates have been recently manufactured in Germany and the methods of their preparation are not known. For passage fares to different parts of the world write to Mackinnon Mackenzie & Co., 16 Strand Road, Calcutta. Approximate living cost on a simple scale in foreign countries vary from 150 to 250 rupees.

1712 D. R. C., Poona. For information regarding educational matters in America, enquire of Hindusthan Association, 116 West, 59th Street, New York City, U. S. A.

1713 R. M. R.. Burdwan. For betelnut cutting machines write to Medland Bose & Co, 13-1 Old Court House Street, Calcutta. For cigarette making machines, write to United Cigarette Machine Co, Dresden A, 21-1 ; Buro Baner Munchen, Hesstrasse 90 ; both of Germany.

1716 N. T. M., Karachi. Envelope making machines may be purchased of Bengal Small Industries Co., 91 Durga Charan Mitter Street, Calcutta. Pencil making machine may be imported through Oriental Machinery Supply

Agency, 20-1 Lal Bazar Street, Calcutta.

1717 R. S. S. R., Nellore. It is impossible to describe the method within the small space at our command. Please go through books on ceramics to be had of Messrs Chakraverty Chatterjee & Co., 15 College Square, Calcutta.

1718 M. N. R., Vizianagram. No further details of the article are available. Wants appliances for making photo medallions.

1719 I. W. I., Kuppan. No big exhibition is being held in India. Gunny cloth is exported by Grandage Moir & Co., 15 Clive Row ; Ralli Bros, 1 Church Lane ; Ganny Hajee Ahmad, 23 Amratolla Street ; all of Calcutta. Printings are undertaken in Germany by August Scherl G. m. b. H., Buchdruckerei Berlin S. W. 68, Zimmerstrasse 36-41. Half-tones are made by P. Datta & Co, 112 Upper Chitpur Road, Calcutta. Lithographing work is executed by Calcutta Fine Art Cottage, 76 Dharmatalla Street, Calcutta.

1720 S. P., Clavakkot. You may consult Mr A. P. Ghosh, Match Expert, 42 Beniapukur Road, Entally, Calcutta.

1723 R. S. J. S., Dhoraji. Ear-phones are available of Lawrence & Mayo, 16 Old Court House Street, Calcutta.

1724 P. B. L. M., Cawnpur. Renovating type-writer ribbons appeared in August (1921) issue of INDUSTRY. Boots and shoes are manufactured by Lucknow Boot and Shoe Factory, 19, Nasirabad, Lucknow ; Gwalior Leather Factory and Tannery, Morar ; Cawnpore National Shoe Factory, Halsey Road, Cawnpur. Plumbago is the main ingredient in making lead pencils. Wants to be put in touch with suppliers of lizard, crocodile and snake skins.

1725 N., C. S, Cuttack. Please write clearly for what purpose the machine is intended.

1726 I. M. C., Nainital. For your requirements enquire of Nurjehan Nursery, 2, Kakurgachi Lane, Calcutta. For Secondhand books write to Messrs. T. C. Auddy & Co., Wellington Street, Calcutta.

1727 K. G. P., Saugor. There are several books on bakery and biscuit making which you may consult. The books are available of the book-sellers above referred to.

1728 C. L., Tirkhan. Try Thacker Spink & Co., Esplanade, Calcutta. Stencils can easily be made from tin sheets. Incandescent lamps are used for the glowing white light they emit. Formulas of varnishes and stamping inks have already appeared. It is difficult to secure all the names of villages in a district. Consult the postal guide and this may help you to some extent. For a list of library journals and their subscriptions communicate with The British Association of Trade and Technical Journals, Sicilian House, Southampton Row, London. For subscription rates of particular journal you are to communicate with the manager of that paper. For Hindi typewriters enquire of Remington Typewriters Co. Ltd., Council House Street, Calcutta. Colours, tissue papers, etc. may be had of K. B. Nan, 233, Old China Bazar Street, Calcutta. Toilet articles may be had of stationers. Varnishes and brushes may be had of Dass & Co., 41-B, Clive Street, Calcutta.

1730 R. S. S., Rohtak. German toys are manufactured by Hens Krauss Nachf, Nurnberg, Gartenstr, 17 E ; Wilh. Schroder & Co, Ludenscheid i. W. ; Carl Gross, Esslingen a. N. : all of Germany.

1731 S. S., Jwalpur. A reference to any text book of chemistry will help

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D. B. MOTIWALA & SON.
Morland Road, Byculla, Bombay.

you in undertanding the differences between the several compounds of lead. Wants to purchase white shellac. No method of paraffining match sticks by cold process is known.

1732 M. M. A., Cuttack. For dhoties and saries write to Friend's Society, Mirzapur Street ; Eastern Bengal Trading Co., 30, College Square ; both of Calcutta. Pictures are printed by Calcutta Fine Art Cottage, 76, Dharmatulla St., Calcutta. Use aniline dyes for colouring powders. Formula of lime juice glycerine appeared in the August (1921) issue.

1734 D. N. D., Lahore. No such formula is known.

1735 A. P., Hubli. Write to the authorities of the institution for information.

1737 R. S., Karaikudi. To sell bone manure you have to advertise widely in papers and circularise the agricultural farms, and tea, coffee, indigo and other estates.

1738 J. Bros., Hyderabad. German sewing machines may be had of Mundlos Aktien-Gesellschaft, Magdeburg 40 ; Roper and Nehring Kaiserslanterns ; both of Germany. Soaps perfumes are dealt in by Perfumeriefabrik Hermosa Carl Hamsen Jr. Bockmann strasse, 49, Hamburg, Germany.

1741 G. G. K., Delhi. Your enquiry is outside the scope of INDUSTRY.

1743 P. A, Kyankpyu. To dispose of your goods you have got either to advertise or circularise to the industries which may need them.

1745 J. B. D., Auliabad. Nib making machine may be had of Bengal Small Industries Co., 91, Durga Charan Mitter Street, Calcutta. They will be able to furnish you with estimates.

1746 S. M. A., Madura. To emboss printing you have to employ machineries to be had of Ashutosh Auddy, 16, Lower Chitpur Road, Calcutta.

1747 P. L., Lucknow. Wants to purchase an engine driven merry-go-round.

1748 K. S., Kandy. Process of preparing pain balms appeared in the December, 1922 issue.

1749 R. B., Lucknow. No method of deodorising barium sulphide is known. Oil of lemon or winter green may partly disguise the odour.

1750 Roll No. 17362, Akyab. Sassafras is a kind of laurel ; Hindi equivalent of the oil is unknown. Paper flowers are made from paper. Commission agent in Calcutta are Nanabhai Raghunathji Desai, 10, Ram Kamal Sen Lane ; Radha Krishna Dey, 41, Strand Road ; both of Calcutta.

1751 S. N., Wazirabad. Match splints and veneers may be had of Bhowani Engineering & Trading Co., 122-1, Upper Circular Road, Calcutta.

1752 L. A., Irinjalakuda. You may refer your query to the Philatelic Society of India, 15, Burrows Street, Bombay. You may also go through November 1921 issue of INDUSTRY in which an article on stamp collection appeared.

1753 C. M. I, Murree. Crude from of potassium carbonate is known as pearl ash. Pearl-ash may be bought of B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta.

1754 M. A. M. A., Cawnpore. Optical goods may be supplied by Wilhelm Cornehls, S42, Ritterstrasse 92, Berlin and Optisch-Mechanische Tabrik Steindorf & Co, S. O, Reichenberger Strasse, 142, Berlin ; both of Germany. For lanterns enquire of Frost & Muninger Lands, Bergerstrasse

Soap and Perfume Manufacturers

FREE samples of perfumes for above trade will be sent on receipt of the inquiries from bonafide manufacturers. Excellent qualities of the highest strength. Prices lowest.

Write for Samples to-day—

Anglo-Indian Drug & Chemical Co.,
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P. O. Box 2082, Bombay.

19, Berlin ; C. Albert & Co., Paulstrasse 10, Barmen and Wesche & Bruchhaus, Herzogstrasse 75 ; Dusseldorf ; all of Germany. For haberdeshery enquire of L. S. Mayh G.m b.H.. Ritterstrasse 61, Berlin and G. A. Poppitz & Co., Lange Strasse 1, Chemnitz ; both of Germany. Cutleries may be supplied by Hugo Linders Deltawerk, Solingen and Otto E. Steihl G. m. b. H., Ohligs-Solingen ; both of Germany.

1755 R. N. R., Valangaman. For starting small industries please go through the September 1923 issue of Industry. To secure agents advertise in some paper.

1758 B. S., Pondicherry. Formula of blue black ink appeared in June 1923 issue. Dissolve 1 oz. eosin S. (yellow shade) in 5 pints of distilled water ; then add 1 oz. gum arabic in 2 gallons of distilled water and apply heat. Pour in eosin solution to gum solution while hot. The product will be brilliant red ink. For hair oils you may go through the Book on Hair Oils published from Industry Office by an expert. Seek medical advice.

1759 R. S., Kottar. Home printing presses may be had of Messrs S. C. Dutt & B. K. Dutt, 100, Durga Charan Mitter Street, Calcutta. You may go through Commercial India, 22, Shambazar Bridge Road, Calcutta. Paper is imported by Bhola Nath Dutt & Sons, P. O. Box 438, Calcutta ; John Dickinson & Co. Ltd., Ballard House, Fort, Bombay and R. Coleman & Co., 106, Broadway, Madras. You may write to the firms whether they are inclined to open agency or not. For other queries write to the Railway department.

1760 H K., Bombay. Please refer to No. 1710.

1761 A. K., Bombay, For books on precious stones enquire of Thacker Spink & Co., 3, Esplanade East and Chakravertty Chatterjee & Co , Ltd., 15, College Square ; both of Calcutta. For cleaning pearl, etc. please go through July 1921 issue.

1763 G. G. R., Masulipatam. Dyes may be had of Dadajee Dhackjee & Co., Samuel Street, Vadgadi ; Esmailjee Gootamally Rangwalla, New Bardan Lane ; Manilalji, Vadgadi and H. C. Mehta & Bros , Samuel Street, Vadgadi ; all of Bombay.

1764 N. G. D., Nagpur. Please refer your enquiry to the Registrar, Joint Stock Companies, Government Place, Calcutta.

1765 R. V. R., Patur. Flour is prepared from wheat by grinding it in milling machine and then cleaning. You may prepare flour by grinding mill also which you have got. The required machines may be had of Messrs Burn & Co , 7, Hastings Street and Messrs Ghatak & Co., Rai Bahadur Road, Behala ; both of Calcutta.

1766 S. P , Kolhapur. In preparing crayons if adhesive is required you may add a quantity of gum arabic. Buttons are made from horns, coconut shell, ivory ; celluloid, leather, glass, metal, etc. etc.

1767 M. L. S., Farrukhabad. Constant use of white oil as hair oil loosens the root of the hair and hinders active growth. The following are some of the jewellers of Rangoon : Coombes Co. Ltd., 12, Phayre Street ; Goonamal Parasram, 73, Phayre Street and I. A. Hamid & Co , Minto Mansions, Halpin Road. Take brass, 12 parts ; zinc, 6 parts ; tin, 1 part ; melt and use as solder for brass. For books on electroplating enquire of Chakraverty Chatterjee & Co. Ltd, 15, College Square, Calcutta.

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We have manufactured this **Arvind** Eucalyptus Oil in our own Factory at Coonoor—the Nilgiri—Hills—under expert supervision.
Used for Plague, Cholera, Malaria, Influenza, Rheumatism, Cuts, Sprains, Burns, Scorpion—Bites etc etc
One lb. bottle Rs 1/8/3, one oz bottle As. 4
Ample Discount on Big orders.
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Bombay 4.

1769 M. D. B., Mhow. An exhaustive article on candle making appeared in December 1922 issue.

1771 S. R., Pilibhit. Imperial Commerce, 41, Cullum Street, London E. C. 3.; Dun's International Review, published by Messrs. R. G Dun & Co., The Mercantile Agency, 290, Broadway, New York, U.S.A. and International Trade Developer, 21, Old Court House Street, Grosvenor House, Calcutta may serve your purpose for the present. Photographic materials may be supplied by R. Kanishi, 2, 3, 4, 17 and 18 Nichome, Hancho, Nihonbashi-ku-Tokyo and S. Kuwada & Sons, 17, Shinsaibashi Audgi-machi, Minami-ku, Osaka ; both of Japan.

1771 (A) K. V., Bapatla. Formula of fountain pen ink appeared in the last issue.

1772 S. P. W., Kanauj. White oil may be purchased of Anath Nath De & Co, 3, Moidaputty, Calcutta. Glass phials and corks may be bought of Satya Charan Paul, 194, Old China Bazar Street and C. K. Dass & Sons, 17, College Street ; both of Calcutta. Ceylon products are imported by Messrs. Peterson & Co., Samavaya Mansions, 6-1A, Corporation Street, Calcutta.

1773 M. B. D., Nagpur City. For printing you may correspond with Balodyan Sadasive Peth, Poona City.

1774 S. S. S. P., Hyderabad. For learning knitting you may write to Mr. N. C. Bose, Belligbata, Calcutta.

1776 S. S. W., Indore. You may write to Registrar Joint Stock Companies, Government Place, Calcutta for particulars of the company.

1777 R. G. S., Kumbakonam. Card soap is prepared with tallow and soda. White glue may be had of Madhab Chandra Daw, Khangraputty, Calcutta. Isinglass may be had of Messrs B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta. Colours may be had of Messrs Amin Chand Mehra & Co, 34, Armenian Street and Mohamed Alibhoy & Sons, 44, Armenian Street ; both of Calcutta. China clay and pipe clay may be had of Arjun Ladha, Chaibassa, Singhboom. Spirit of wine is rectified spirit.

1778 I. C., Hafizabad. The following are some of the bone mills of Calcutta ; Bengal Bone Mills, 8, Old Court House Corner ; Calcutta Bone Mills Co. Ltd., 11-2, Sukeas Lane, and Katni Manure Works, 17, Amratolla Lane. Books may be had of Messrs. Chakravertty Chatterjee & Co. Ltd., 15, College Square ; Book Co. Ltd., 4-4A, College Square and Kamala Book Depot Ltd, 199, Cornwallis Street ; all of Calcutta. For ferro printing you may go through December 1921 issue. Dentistry is taught by School of Dentistry, 26A, South Parade, Bangalore and The Calcutta Dental College and Hospital, 261 Bow Bazar Street, Calcutta. Wants a capitalist to invest Rs. 1000 in some profitable trade.

1779 B. C., Calcutta. Biscuits are manufactured by Britannia Biscuit Co, Dum Dum Jn. ; K. C. Bose & Co., Kala Chand Sanyal Lane, Shambazar and P. Sett & Co , 8, Ram Kanto Sen Lane, Ultadanga ; all of Calcutta.

1781 R. R. N., Kanoki. Tablet making machines may be had of Calcutta Industries Ltd, 71, Canning Street, Calcutta.

1782 B. S. R., Malur. Envelope making machines may be had of Oriental Machinery Supply Agency Ltd., 20-1 Lall Bazar Street, Calcutta.

1783 K. C, Shweho. Write for the particulars of foreign education to the Secretary, Education Department, Government of Burma.

1787 K. B. B., Bombay. Good photoes may be had of Photo Atelier. 349, Upper Chitpur Road, Calcutta.

Genuine Homeopathic.

Medicine at 5 and 6 pice per dram. Tissue remedies. Books and other articles moderate rates. Trial Solicited.

P. C. DAS & CO,
Homoeopathic Pharmacy,
42/4, Clive Street, Calcutta.

Process of dyeing silk appeared in January 1922 issue of INDUSTRY.

1788 M. N. I., Haksar. Please consult a physician.

1789 R. C. B., Secunderabad. Toys may be supplied by H. Offenbacher & Co., Nurnberg, Carl Daum, Sonnerg, Thuringen, and G. Rohmsteck jun, Deutscherrustrasse 7 Nurnberg: all of Germany. For clocks and watches write to Hermann Kanard, Alois Morat, Neustadt, Schwarzwald, Germany. Musical instruments may be supplied by Alphons Bergst & Co. G. m. b. H., Dresden A 24 and G. A. Hawraneck, Markneukirchen i. Sachsen; both of Germany. For fancy goods enquire of G. Brehmer, Markuenkirchen 18; Franz Krauss & Co, Nurnberg and Kaumheimer & Aal, Berlin C 19; all of Germany.

1792 C. N, Laitkynsew. Honey may be had of B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta and Himalayan Stores, Kasauli Hills.

1793 P. S. V. I., Karaikudi. Desires to buy transparent celluloid sheets.

1794 N. S. C, Kovur. For tin printing enquire of Calcutta Tin Printing Works, P. O. Box 6772 and Indian Colour Printing & Hollowwares Ltd, 133, Belliaghata Main Road, Calcutta: Bottles may be had of Satya Charan Paul & Sons, 194, Old China Bazar St., Calcutta.

1795 N. J. D., Dhrangadra. For the formula of amla hair oil you may correspond with our perfumery specialist.

1796 S. N., Kyaikto. For refining til oil filter through good quality flannel. Formulas of hair oil will be found in Hair Oil Manufacture Published from INDUSTRY OFFICE, 22, Shambazar Bridge Road, Calcutta.

1797 G. S., Amritsar. Recipes of rice starch appeared in April 1924 issue. For books on the subject enquire of Chakraverty Chatterjee & Co., Ltd, 15, College Square, Calcutta.

Notice & Reviews.

Hair Oil.

The scented and medicated hair oil of Messrs Sircar & Co., Debotter P. O., Pabna goes by the name of "Ramani Bilas Taila". It keeps the head cool.

Toilet Articles.

Prof. Row's specialities consist of (1) Red Marking Ink which leaves indelible marks on linen. (2) Delightfully perfumed Pushpa Malati Hair Oil (3) Toilet Snow, an emollient face cream with pleasant aroma. These are manufactured by Messrs. N. V. R. Kameswar Row & Co, The Lakshmi Chemical and Perfumery Works, Pedapatnam, Nagaram P. O., Godavari Dt.

Unique Slates.

The trouble of keeping handy paper and pencil can be obviated by using the novel slates of The Union Trading Co., 125 Muktaram Babu Street, Calcutta. They can be written upon with any pointed appliance while the surface can be used over and over again.

Defensive Club.

Messrs S. Abid & Co. 152-56 Nagdevi Street, Bombay 3 have sent us a handy metal "club" of foreign make which can be used for self-defence against odds.

Dyestuff.

The sole distributors of Jacobus dyes in India are Messrs R. S. Talegaonkar & Bros., 667, Sadashiv Peth, Poona. These are direct colours and can be easily manipulated.

Agarbathees.

Mysore is famous for agarbathees or Sandal incense sticks and the sample lot we have received from Messrs. K. T. Appannah & Co, Bangalore City fully upholds its reputation. The perfume exhaled by the sticks will gladden the heart of all.

Chalk Crayons.

Chalk crayons of good quality and of different colours are manufactured by Messrs, Nandan Trading Co., Phulatti Bazar, Agra. They are not brittle like others and as such deserve a wide sale.

Nibs and Badges.

Brass nibs and school badges are made by Messrs Qureshi Abdur Rashid, Gujrat (Pb). The nibs ensure facile writing and the badges are attractive with tri-colour printing.

Magic Ink.

Messrs Rama Bros. of Chunian, Lahore have sent us a phial of sympathetic ink which will leave no mark on the paper but the writing will appear on the application of heat.

The Teachings of Islam.

By Mirza Ghulam Ahmad of Qadian, India. Pp. 195. To be had of Messrs Fazil Brothers, 65 Alexandra Road, Secunderabad (Dn). A special interest attaches to this work in that the author is the founder of the Ahmadiyya movement which has engaged so much public attention in recent times. The writer has expounded the teachings of Islam, one of the greatest religions of the world, with considerable lucidity. Any one perusing the handbook with open mind will profit by it. Non-mahomedans particularly will have an opportunity of studying the Muslim tenets, ethics and belief.

Plague Safety Necklace.

The bold claim made for this unique necklace is that any one wearing it need not fear infection from plague. It may be had of Dr. D. C. Prithi Chand Varma, The National Medical Hall, Hafizabad, (Pb.)

Remedy for Piles.

We have received from Messrs D. B. Motiwala, Morland, Byculla, Bombay a pot of Pile ointment said to relieve suffering effectively.

Indian Art Wares.

All kinds of art wares for which Jaipur is renowned may be had of Messrs Narayan & Co, Nanak Chowk, Jaipur City. They deal in well-carved marble statues; painted alabaster dolls; attractive toys of ivory and sandal wood; artistic marble wares and also textiles and jewellery.

Easy German Reader,

Book II By Dr. Pashupati Nath Shastri. Pp 60. Price As. 8 only. To be had of Messrs Sen Brothers, 15 College Sq., Calcutta.

The lessons incorporated in this primer comprise easy stories, short anecdotes and typical readings. They have been selected judiciously so as to make them at once interesting and instructive. Those who have finished Book I, which we had occasion to review in an earlier issue, will find no difficulty in proceeding with Book II.

THE PEACOCK INK WORKS.

Imperial Ink Tablets.

Unparalled in the Market.

One tablet gives one ink-pot of ink of an excellent quality and even can be used in fountain pens. **Blue Black** Re 1-4. **Red** Rs 1-6, **Green** Rs 1-8, per tin of one gross (144 Tablets) **Postage extra** Best Rubber Stamp Inks Blue, Red and Violet). Special rate to wholesale dealers.

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THE PEACOCK INK WORKS
Suppliers to the Imperial Bank of India.
and all leading mercantile firms of Calcutta,
10, Guruprosad Roy Lane, Hatkhola Calcutta.

Trade Enquiries.

[Letters to the parties are to be addressed by number and initials under care of INDUSTRY when these will be duly redirected]

1574 M. B., Multan City Wants to be put in touch with dealers in mushadi silk handerchiefs, silk lungis, silk-cloth asafoetida, dhania oil and soaps of all kinds.

1615 K S. R. A, Tinnevelly. Can supply cotton waste and bone charcoal dust in large quantities.

1655 T. R M., Seeramangalam. A very poor man wants a loan of Rs. 400 to repay on monthly instalment of Rs. 10.

1669 R C. W., Srinagar. Wants to be introduced to dealers in cotton yarn

1676 L S. R., Jullundur. Wants to be introduced to dealers in almonds.

1736 M L. M., Cawnpore. Desires to buy mica powder.

1784 S C. D, Calcutta. Wants an expert for the manufacture of toilet soap, washing soap, perfumery, essences, hair oils, syrups, etc.

1791 B. S., Kolaghat. An energetic youngman wants to offer his services to any weaving or dyeing factory.

1826 G. R. N, Masulipatam. Can supply bed covers, door and window curtains, table and tepoy cloths of various designs.

1848 K. C R, Barisha Wants to be a paid probationer in a commercial firm.

1855 S B S. M. Rohtak Wants be put in touch with dealers in imitation silk available at Ludhiana and from which Nale (Izarband,) is made

1865 N. S S, Aligarh Wants to be introduced to tobacco leaf dealers of Bombay, Poona, Nagpur, Amraoti, Madras, Mysore and Bangalore.

1907 J. D. V, Bahjoi. Wants to be put in touch with dealers in flour-spar.

Revolution in the Literary Societies.

Srikrishna.

His Life and Teachings By Mr Dhirendra Nath Pal. The book really fascinates the readers like eypnotic influence, For details and opinions please write to—

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127, Musjid Bari Street, Calcutta.

October issue of Industry.

(In the Press.)

The October issue of INDUSTRY will contain articles on Glazing Earthenware, Cap-making, Tobacco, for Hooka, etc. in addition to the usual feature such as New Ideas, Small Trades, Formulas, Processes, etc. Any friend of our subscribers may get a copy free as sample on application to The Manager, Industry, Shambazar, Calcutta.

New Idea Prize Notice

In deference to the wish of Mr. E. Lakkaraju Naidu of Kharagpur, one of the winners of the INDUSTRY New Idea Competition for 1923-24, we have sent to him a silver medal bearing suitable inscriptions in lieu of cash prize As has been pointed out by him a medal will be of more permanent interest to the recipient than its money value We therefore inform our competitors that in future the New Idea Prizes may be awarded either in cash or in medal form according to the desire of the successful candidates.

INDUSTRY.

Is a monthly Journal of Technology and Handicrafts, Science and Commerce, Agriculture and Business. The rate of subscription is as follows:—

Indian Rs. 3 Foreign Rs. 5-4.

The charge is for complete yearly volume only, inclusive of postage.

Single Copy As 5 only.

BUblishINE NOTICE.

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Shambazar, Calcutta.

Managing Editor—Mr. K. M. Banerjee.

INDUSTRY

A Journal of Technology Handicrafts & Commerce

Vol. XV. CALCUTTA, OCTOBER, 1924. No. 175

To Increase National Wealth.

THE economic condition of the people of India is distressing. Our poverty has well-nigh become chronic. This state of affairs can be remedied only by increasing the national wealth On the one hand we shall have to derive or create wealth and on the other we shall have to conserve the inherited or acquired wealth.

The natural wealth of India is immense. She is rich in the possession of valuable mines and forests and extensive fertile soil with irrigation facilities. We may derive vast wealth from these sources. By improving agriculture on scientific lines we can grow newer and useful crops and can make the soil yield more By proper afforestation we can reserve the wood and timber capacity of the forests. By judicious utilisation of the minerals we can tap the potentialities of the mines to the utmost.

But we must be extremely careful that these natural resources are not wantonly wasted or irrevocably lost. Neither must they be exploited in a manner deterimental to the interests of the children of the soil.

The most important point for our consideration is how best to convert these natural resources into "utilities" or objects of value. For the production of wealth we shall have to start industries, large and small, for the manufacture of both the necessaries and luxuries of life. Wealth will be created by the convertion of raw materials into finished products. The great importance of a sound industrial policy in the enhancement of national wealth is thus significant. It must be realised that the industrialists are the real benefactors of the country and its people and their enterprises are worthy of universal support.

Next, our national wealth can be conserved by using country-made products, by utilising otherwise refuse and waste materials, by restricting our necessities to articles made in India and by doing away with luxuries manufactured outside. Thus both the producers and consumers may co-operate with one another to create and conserve national wealth and consequently helping to increase it. And by manufacturing articles and using them we will not only enrich ourselves but also make our motherland prosperous.

INDIA'S INDUSTRIAL PROGRESS.

Discovery of Bauxite.

Vast discoveries of bauxite, the ore from which aluminium is extracted, have been made in the Kolhapur State, Bombay Presidency. There is sufficient bauxite in sight to produce, for a great number of years, a quantity of aluminium equal to one-half of the present output of the rest of the world. In connection with the development of this industry, there has been prepared an ambitious hydro-electric scheme, and it is anticipated that when the site is fully developed the plant will have an output of not less than fifty thousand electrical horse power.

Technical Education in Bihar & Orissa.

The Bihar School of Engineering has been raised to the status of a college and its scope broadened A similar school has been opened at Orissa. The Tirhut Technical Institute will not only train educated young men for positions as foremen and submanagers of engineering works, but will also give instruction in practical boat making, carpentry, and blacksmithing to those of lower educational qualifications. The Tata Iron and Steel Co and its allied establishments, as well as railway shops offer opportunities for an advanced practical technical education.

Citronella Oil of Ceylon.

The annual production of oil citronella in Ceylon equivalent to the Java oil is estimated at 800,000 pounds, and almost the whole of this is absorbed by the growing perfumery and soap trades of Holland and Japan. Except for a small extent of land covered with a type of wild citronella in the Morawak Korale and a slightly greater acreage covered with a hybrid citronella grass known among the local people as "Lena Batu" in the Matara District, the rest of the citronella area of Ceylon is covered with only the true high-class citronella grass grown in Burma and Java and known in the vernacular as Maha Pangiri (large citronella). Expert opinion holds that citronella grass grown and distilled in Ceylon under ideal conditions is quite equal in "geraniol" content to the best grass grown and distilled in Java and Burma.

Phosphatic Manures in India.

According to a note of the Department of Agriculture on the utilisation of indigenous phosphates, the supplies of phosphatic manures in India are limited, and consist of raw mineral rock or nodular phosphates, bones and fish guano. The former deposits are restricted but up to the present little has been done to develop those available. Bones are probably the most important phospatic manure in India, and bone crushing and grinding factories are found throughout the country The total supply is, however, only a small proportion of India's requirements. Fish guano is nitrogenous as well as a phosphatic manure. It is a by-product of the fish oil industry. The supply is variable, and depends mainly on the shipping demands. The reason which has hampered the growth of superphosphate industry in India is scarcity of sulphuric acid. If this acid be made cheaper bone manures will be more easily available by conversion to superphosphates by chemical treatment.

Tobacco for Hookah.

(By a Practical Expert.)

IN the luxury and splendour of smoking tobacco none could possibly excel the oriental votaries of "My Lady Nicotine." Indeed judging from the stately hubble-bubble with all its paraphernalia the Mogul Emperors of India carried the art to the high-water mark of perfection. For adaptation to this sort of smoking, the tobacco has to be prepared into a doughy mass for which industry, Lucknow, Delhi, Gaya, Bishnupur and other places in Upper India have become famous.

There are several varieties of tobacco plant grown in India particularly in Rangpur such as, Pulapata, Matihari, Hingli, etc. The leaves must first be cleaned from dirt and dust ; and in some cases deprived of their stalks and then pounded into powder. There are two distinct stages in the preparation of tobacco for hookah. In the first place a quantity of tobacco powder is mixed with mashed flavoury fruit and cheap treacle, put in an earthenware vessel, buried in earth and the stuff allowed to season for a month or more. In the next place another quantity of tobacco is kneaded with treacle with the addition of suitable perfumes. Finally smoking tobacco is obtained by mixing together the perfumed tobacco and the seasoned tobacco in definite proportions. As a general rule the spices should be added in powder form. Much depends upon final kneading.

The tobacco may be prepared in three different strengths : mild, strong and medium. The perfumes may be selected so as to suit the taste of the consumer. The quality and price of the tobacco will therefore naturally depend upon the nature and choice of the ingredients incorporated.

KHAMIRA OR SEASONED TOBACCO.

1. JACK-FRUIT KHAMIRA. (a)

Take 10 srs. of Pulopata tobacco leaf. Clean them from dirt and dust. Pound the leaves to powder in a *Dhenki* (rice husker). Procure a ripe jack-fruit of the soft variety : take out only the cells rejecting the skin, the seeds and the stump. Mix the tobacco powder with a quantity of jack-fruit cells (about 10 srs.) sufficient to moisten the powder. Now dry the wet mass into small cakes : when perfectly dry pound them again in the husker and shift through a sieve. Then add 5 srs. of *kotra gur* (treacle for tobacco) or more if required. Mix the whole thoroughly ; put into an earthenware vessel ; close up its mouth and bury into the ground for about one month. By that time the tobacco will be seasoned.

2. JACK FRUIT KHAMIRA. (b)

Hingli Tobacco powder	10 srs.
Jack-fruit cells	10 srs,
Kotra gur	5 srs.

Proceed as above.

3. PINEAPLE KHAMIRA.

Hingli Tobacco	10 srs.
Pineapple coring	as required
Kotra gur	5 srs.

Proceed as above.

4. PLANTAIN KHAMIRA.

Pulopata Tobacco	10 srs.
Plantain	as required
Kotra gur	5 srs,

Proceed as above.

Select over-ripe plantains of the Champaka variety.

5. ROSE KHAMIRA.

Hingli Tobacco	10 srs.
Dried rose powder	10 srs.
Kotra gur	10 srs.

Proceed as above.

6. PLUM KHAMIRA.

Hingli Tobacco	10 srs.
Ripe Plum	5 srs.
Kotra gur	7½ srs.

Proceed as above.

Select plums of the *topa* variety and reject the stones.

7. MUSK MELON KHAMIRA.

Hingli Tobacco powder	10 srs.
Musk melon	,,
Kotra gur	5 srs.

Proceed as above.

Peel the melon and reject the seed and pulp.

8. ORDINARY KHAMIRA.

Pulopata Tobacco	10 srs.
Dana	½ sr.
Patchouli	,,
Stephania	,,
Cardamom (major)	1 tola
Cloves	,,
Nutmeg	,,
Saffron	,,
Treacle	10 srs.

Mix the tobacco powder with treacle : add the spices and perfumes. Proceed as above and allow to season.

TAMAK OR SMOKING TOBACCO.

1. MEDIUM.

Motihari tobacco in powder	5 srs.
Kotra gur	as required.

Moisten the tobacco powder with the treacle and pound in the husker : then incorporate into it

Jack fruit khamira (a)	1¼ srs.

Then perfume with

Keora gad	¼ tola
Sandal oil	¼ ,,

Knead the mass thoroughly and uniformly.

2. MEDIUM.

Motihari Tobacco Powder	5 srs.
Hingli	,,
Kotra gur	as required
Pineapple khamira	2½ srs.
Dana	1 tola
Patchouli	,,
Stephania	,,
Cardamom (major)	,,
Sandal oil	¼ tola
Keora gad	⅛ ,,
Silaras	⅛ ,,

Follow the directions given above in different stages.

3. MEDIUM-STRONG.

Motihari Tobacco	4 srs
Kotra gur	as required.
Plantain Khamira	1 sr
Sandal Oil	⅛ tola
Majuma	,,
Silaras	,,

Follow the above directions.

4. MILD-MEDIUM.

Pulopata powder	5 srs.
Kotra gur	as required.

Mix together and incorporate into it

Ordinary Khamira	2 srs.

Then perfume with

Sandal oil	¼ tola
Nutmeg	1 tola
Keora gad	⅛ tola

Knead thoroughly.

5. STRONG. (a)

Gach tamak powder	5 srs.
Kotra gur	as required

Mix well and perfume with

Dana	½	tola
Patchouli	,,	
Silaras	,,	
Cardamom (major)	,,	
Stephania	,,	

Knead thoroughly.

6. STRONG. (b)

Motihari tobacco powder	2½	srs.
Gach tamak	,,	

Mix together and moisten with

Kotra gur	as required

Then add

Sandal oil	¼	tola
Keora gad	⅛	,,

Knead thoroughly.

7. MEDIUM.

Strong tobacco mixture (a)	5	srs.
Rose Khamira	2	srs.

Mix together. Then macerate

Musk	1-16 tola

in a mortar with

Rose water	60 drops

Add this to the tobacco.

The product will be of superior quality.

8. BADSHAHI TAMAK.

Hingli Tobacco powder	1 sr.
Rose water	as required

Moisten the tobacco powder with rose water and dry in a porcelain vessel. Repeat the process for fourteen times day after day. Then moisten with

Kotra gur	as required

and perfume with

Keora gad	1/32 tola
Musk	2 ratis

Knead thoroughly.

9. NAWABI TAMAK.

Hingli tobacco in powder	1 sr.
Dry rose powder	,,

Moisten with Keora water and dry. Repeat the process daily for a week. Then macerate

Musk	1/16 tola

in rose water and add to the above. Finally knead with kotra gur.

10. AMIRI TAMAK.

Hingli tobacco powder	1	sr.
Motihari ,,	1	,,
Kotra gur	as required.	

Mix well : then knead with

Rose khamira	¼	sr.
Pineapple ,,	¼	,,
Jack-fruit ,, (b)	⅛	,,

Now add to the dough the following in powder form.

Nutmeg	1/16 tola
Saffron	,,
Cloves	,,
Cardamom (major)	,,

Next macerate

Musk	1 rati

with rose water and perfume the mixture with it and

Sandal oil	15 drops
Istambul Kahi	⅛ tola

TOBACCO EXTRACT I.

Hingli tobacco powder	1 sr.
Rose water	4 srs.

Digest the tobacco in rose water over slow oven and remove when only 1 sr. of liquid will be left. Strain through clean linen : reject the solid residue and take only the liquid extract. Allow this to evaporate in the sun : it will form a dry cake. Pound the cake into impalpable powder. Mix a little quantity of Kotra gur and one rati of musk. The product will appear like coal tar.

This extract may be smoked in the ordinary bubble-bubble with a little contrivance.

TOBACCO EXTRACT II.

Pulopata powder	1	sr.
Rose petals (dry)	,,	

Bray the two together on a muller stone with rose water into a paste. Then dry in the sun, knead with Kotra gur and proceed as above. The extract may be perfumed with one rati of musk.

GLOSSARY.

Pulopata, Hingli, Motihari, etc—are well-known trade varieties of tobacco.

Gach tamak—a variety of tobacco grown in Gandharbadanga.

Keora gad—the residue left in the distillation of keora water.

Kotra gur—a cheap kind of treacle derived from date jaggery and specially employed in seasoning tobacco.

Dana, Silaras, Istambul kabi—are indigenous perfumes to be had of country grocers.

Lata Kasturi	vegetable musk
Patchouli	pacha pata
Stephania	ekangi
Cardamom	elaich
Cloves	labanga
Nutmeg	jaitri
Saffron	jafran
Treacle	gur
Sandal oil	chandan tail
Keora	pandanus

Glazing Pottery.

THE art of glazing and using encaustic colours has existed in parts of Northern India from an early date. Glazed pottery is made at Multan, Lahore, and elsewhere in the Punjab. The indigenous process of glazing is described briefly.

The two essential ingredients required for the purpose are (1) *kanch*, a vitreous glaze : (2) a calcine or oxide of lead. Of *kanch* there are two varieties. One is a pale, clear bluish glass, like bottle glass in lumps, and known as *angrezi kanch*. The other is country-made or *desi*. The former is made of *sang-i-safed* and pure alkali ; while the latter is made either out of reh or alkali earth with sand, i. e., a natural efflorescent alkali and fine siliceous sand ; or with ground stone and potash : or with stone, borax and sand.

To make the first kind of *kanch* take *sang-i safed* (a quartoze rock) 25 parts ; pure soda 6 parts ; purified borax (sohaga) 3 parts ; sal ammoniac (*nausadar*) 1 part. Each ingredient is finely powdered and sifted, and mixed with a little water, and made up into white balls of the size of an orange. These are burnt in a furnace, till they become red hot, they are allowed to cool, and again ground up and sifted. The material is again put into the furnace till it melts ; when thoroughly melted, one *poa* (½ lb.) of fine, clean, picked saltpetre (*shora kalmi*) is stirred in. [A foam appears on the surface, which is removed with a skimmer, and set aside for medicinal use. It is the *kanch-lon* of the Hakim].

The second kind (Desi kanch) is made by grinding the ingredients already mentioned, sifting, burning and treating as described above. The proportions are however different :—

(A) Sang-i-safed or sang-i-surkh nagoria—a siliceous grit, used for mill stones, and sajji, equal parts.

(B) Sang-i-safed, 4 parts ; sohaga, 3 parts.

(C) Siliceous sand, and sajji equal parts.

The next important articles are the calcines, or oxides of lead. There are "sikka safed" the basis of white and of most of the blues, greens and greys ; "sikka zard" the basis of yellows etc. "sikka sharbati," a pale reddish oxide (litharge) ; and "sikka lal" a red oxide. Sikka safed is made by putting 2 parts of lead and reducing by tin. The furnace used is a closed one, and consists of an hemispherical open crucible, resting on a base or pedestal of clay and surrounded by fire, with a conical covering of some dried bricks ; holes are made to enable the workman to introduce his iron skimmer and stirrers

The lead being melted in the crucible, one part of tin is gradually added in little bits ; vapour rises, and a white powder forms on the surface, which is raked on one side and lifted out into a vessel placed for the purpose : the melting material is constantly stirred. This goes on till the whole is reduced. Care must be taken that no particles of uncalcined metal remains. This is the preparation known as "sikka safed."

Sikka zard is made by exactly the same process of reducing one part of lead with only quarter part of tin. Sikka sarbati is made by reducing 1 part of lead with quarter part of zinc instead of tin. Sikka lal is made by calcining the above product till the whole is oxidised and turns red. These are the various materials which form the basis of all glazes. The colour and the glaze are applied together.

I White Glaze.

It is made with

Sikka safed	1 part
Kanch	1 ,,

They are well ground, sifted and mixed : then put into the kanch furnace and stirred with a ladle. When melted 1/8 part of borax is added. While the fusion is going on the fire must be slack. If the mixture gets a little blackish, a small quantity of saltpetre must be added. When all is ready, the material is taken out and thrown into cold water. The whole mass splits into fragments which are collected for actual application.

The white glaze thus prepared, when mixed with certain ingredients in different proportions yield different tints. The glaze is mixed with the required colouring matter, and both are ground together to an impalpable powder ready for application to the vessel.

(1) Turquoise Blue.

White glaze	1 seer
Thin flakes of oxidised or calcined metallic copper (Chhil tamba)	1 ch.

(2) Violet.

White glaze	1 seer
Oxide of manganese (anjani) mixed with reta or zaffre	1½ ch.

(3) ASH GREY.

White glaze	1 sr.
Retanajani	1½ ch.

(4) SKY BLUE.

White glaze	1 sr.
Zaffre or reta	1½ ch.

Reta or zaffre referred to above is a powder consisting of the black oxide (ore of cobalt), which has been roasted in a furnace and powdered, mixed with a little powdered flint and siliceous sand. It occurs in South India.

As shown above the white glaze is the basis for a set of colours Similarly the yellow glaze prepared as follows forms the foundation of another series of tints.

II. YELLOW GLAZE.

It is made of :—

Sikka Zard	4 Parts
Sang safed or mill stone (Burnt and powdered flint stones)	1 ,,

These are fused in the furnace and when melted, ¼ part of borax is added. The following tints are obtained from it.

(1) DEEP GREEN.

Yellow glaze	1 sr.
Calcined copper (chhil tamba)	3 ch.

(2) BRIGHT GREEN.

Yellow glaze	1 sr.
Calcined copper	1½ ch.

The dull red or "sharbati" colour is made by mixing one seer of sarbati sikka, one seer of sang-i-safed or powdered burnt flint, and melting them together as before with borax.

The colour having been prepared and reduced to a fine powder, it has to be applied with a brush to the surface of the unbaked pottery. The vessels to receive it must therefore be carefully smoothed over, and cleaned with a bit of wet rag. Inasmuch as the pottery clay is red when burnt, there is fear of the more delicate colours being injured. The surface of the vessel must therefore be first prepared (after cleaning and smoothing) with an 'astar' or prime coating of *kharya-mati*, a soft soapy-feeling whitish clay. One seer of it is finely ground for 5 or 6 hours with two tolas of the 'bhimri gum' (acacia modesta) and 'chal' gum (*canorarpus - kathi gond*) two tolas; this is washed up with half a seer of water, then four seers of more water are added. The whole mixture is strained through a cloth ; the residue is ground up again with more gum till all passes through. The whole being left to stand, a fine precipitate is deposited, the clear liquor is drawn off. Two chattacks of borax, and two of finely powdered glass are mixed in, and the preparation is ready to be applied. The points of the supports which hold the vessels in the baking furnace must also be tipped with this preparation.

The vessel being so coated, the colour glaze to be applied is mixed with one seer of *mawa*, a liquid glutinous substance made with 'nishasta' the gluten obtained by washing wheat flour and collecting the subsidence.

This 'nishasta' is ground with the colour and a little water, for 7 or 8 minutes then again with more water till the required consistence of a paint is obtained, and the mixture can be applied to the vessels. The vessels being carefully dried are placed in the furnace.

The structure consists of an outer bee-hived shaped dome or covering, perforated with ventilators; and an inner hollow cylinder, underneath which is a furnace, fitted with four flues, one passing up each side of the cylinder. The bottom of the cylinder is grated, and on the grating, which has a circular area of size according to the structure of the kiln, the vessels are placed. Each is separately supported on small stands (*sipai*), being tripods of burnt clay, having three points on which the vessel rests. The kiln is fired with wood which gives out little smoke cut in small pieces.

After 5 hours of heating the fire begins to take effect; after 7 hrs. the colour swells; after 9 it melts and begins to spread, after 10 it is transparent and smooth; the fire is then stopped and raked out and water poured on. Every ventilator and hole must now be carefully closed, for draughts of wind or dust would ruin the bake. On the third or fourth day, according to season, the kiln will be cold, and the vessels may be taken out.

Use of Poultry Feathers.

A LARGE number of poultry keepers overlook the fact that the feathers of their birds are a marketable commodity and not necessarily a waste product Indeed these can be collected and disposed of fetching a good price for the trouble entailed. For the purpose of marketing, however, poultry feathers should be graded in the following manner; viz (a) Down feathers; (b) soft feathers; (c) stiff wing and tail feathers, usually referred to generally as quill feathers. Lastly the white feathers, which are more valuable, should be assorted separately from coloured one.

Some of the uses of poultry feathers may here be indicated. Down feathers are used chiefly for stuffing mattresses, pillows, cushions, etc. Soft feathers are also in many cases used for similar purposes, but they have a further use in the millinery trade, and by no means only for the least expensive class of goods. White feathers command the highest price for these purposes. Quill feathers are of less value and use nowadays than either of the other kinds. Nevertheless they are used for a number of purposes amongst which may be mentioned the manufacture of feather dusters and certain other articles in the fancy goods and artificial flower trades while the smaller sizes are also sold in small bundles as pipe cleaners

To clean the feathers from their animal oil they should be steeped in lime water made in the proportion of one pound of lime to each gallons of water. The lime residue should be removed from the lime water before steeping the feathers. The feathers should be well stirred into the lime water and then allowed to remain in it for some hours, after which the lime water should be poured off and the feathers thoroughly rinsed in cold running water.

To clean the feathers from dirt only, wash them with soap in hot water afterwards After rinsing they should be well drained either in a sieve or on a wire frame, and well shaken about while still warm, after which a moderate amount of further artificial warming will dry them completely. They should be kept loosely packed in muslin bags, hung up in a dry loft so that air can circulate round and keep them as far as possible from any chance of getting damp, until sufficient have been collected. If they have to be retained thus for any length of time, they should be examined now and then to see that they are free from moth.

Practical Cap Making.

KINDS OF CAPS. Caps are of three kinds : (1) round, (2) oval and (3) folding or boat-like caps.

PARTS OF CAPS. Caps consist of the following parts, viz., (1) the top, (2) the wall, (3) the cushion lining of the top, (4) cushion lining of the wall and (5) the inner patti made of water-proof oil cloth or of leather.

Besides the above five parts they (generally with few exceptions) contain (6) a joining patti (a piece of cloth 2 inches in width and equal in length to the wall) which joins the top with the wall. The felt-like caps also contain (7) a band on the outer-upper end of the wall.

CUTTING. After selecting the cloth out of which caps are to be made cut from it the walls and the top. Walls are generally 20, 21, 22 and 23 inches in length and their width varies according to the choice of the wearer. For the purposes of this article we will suppose that 3½ inches are the medium width of the wall. To cut the wall no special instructions are required. Simply cut an inch or so more than the required size to make allowance for turning at both ends. It may however be noted that in making caps in a greater number it is always desirable to take a piece of cloth of the required length (of the wall) and to cut from its width the convenient number of walls. To cut the top we have to first make a cardboard model-top of the required size and then with its help the cloth is cut. The lining cloth is also cut similarly. The circumference of the top is nearly equal to the length of the wall.

MAKING OF CUSHION LINING. Take thick paper pieces of the size of the top and the wall, evenly spread over them nice carded cotton, over which place the lining cloth. If you have got a sewing machine prepare the cushions with its help making cross stitches on the top cushion and parallel stitches on the wall cushion at the distance of about one-fourth part of an inch from each other but leaving about ¾ths of an inch at the border unstitched. The cushions are now ready. If you have not got a machine you can get this work done by a tailor at about half an anna per cap.

JOINING AND STIFFENING. The following operations are now performed in serial order :

(1) Sew one side of the wall with the joining patti (6th in the list of) parts).

(2) Turn the patti towards the sewing and stitch it from outside also just below the inner sewing. This is done in order to make the first sewing strong and is optional.

(3) Sew the two ends (mouth) of the patti and the wall at their width with each other and stretch the sewn end (one end each side). Temporary stitches may be made to keep the sewn ends divided. The temporary sewing may be removed when the cap is ready.

(4) Take the cushion lining of the top and the top proper and placing the latter by the paper side of the cushion sew them all together with the other end of the joining patti.

(5) Take the wall cushion and sew end of it with the *lining only* (at the portion left unstitched) of the top cushion.

(6) Carefully turn the wall with its cushion upside down without spoiling its stiffness and taking a piece of gunny which has already been made stiff by sizing with cooked wheat flour, cut from it a piece of the necessary length and width for the wall and after sewing its two ends one over the other insert it between the wall and the wall cushion. In order to keep the gunny in its proper place temporary stitches (to be removed when the cap is ready) may be made on the upper part of the wall and through the gunny after setting it at the proper place.

(7) Sew the lower end of the wall with the gunny inserted by turning the spare portion of the wall inside and taking care not to let the thread pass to the upper cloth.

(8) Carefully place the two mouths (width-wise ends) of the wall cushion one over the other and turning the upper end slightly inside sew them.

(9) Similarly sew the lower end of the wall cushion to the inwardly turned portion of the wall, covering the gunny and the stitches.

(10) Sew the water-proof or oil-cloth-patti to the turned portion of the wall covering the stitches of the cushion.

(11) This is the last operation. The top is pressed downwards and the patti (joining the top and the wall) is sewn from towards the top—just in the middle—to the stiffening gunny in the wall without letting the thread pass to the outer wall. This is done to keep the top, the wall, and the joining patti itself in their proper places.

The cap is now ready. It would be a folding cap. If cardboard is inserted in the wall in place of the gunny it would be an oval or round cap according to the cut of the top. The only difference between round and oval caps is in the cut of their tops,

In order to understand the above lines thoroughly furnish yourself with cloth, etc. and proceed step by step as herein directed. If any reader meets with difficulty in proceeding the writer will be glad to furnish further instructions.

This industry can be useful for pardah ladies, widows, self-supporting students, industrious people in need of work for leisure hours as also be for small capitalists. It can also be introduced in villages. An estimate for making 12 caps is given below.

	Rs.	As.
(1) 2 yards of half-cotton cloth of single width	2	12
(2) 2 yards of lining cloth	1	4
(3) Carded cotton for cushions		3
(4) Gunny		4
(5) The joining patti		4
(6) Oil-cloth patti	1	0
(7) Paper, thread, etc.		4
(8) Tailors charge 4 as to 8 as. for making a cap but calculating your wages at the lowest rate of 4 as. per cap the sewing charges would come to	3	0
Total	8	15

The caps can be easily sold for Re. 1 each and even more. Even if one does not stock caps which would require more capital one can easily make four caps per day in leisure hours thus earning Re. 1 per day. The cap vendors will take all the caps and may also supply the maker with the necessary cloth, etc. In fact if one devotes his whole time (8 hours) to this work he can easily earn Rs. 2, per day as wages and if he has got capital also he may stock caps and get the profit of 4 as. per cap further.

—By Mr. Ambaprasad Tewari,
Vakil,
Daulatganj, Ujjaini, C. I.

The Sun-Dried Poona Fig.

THE growing of figs in Western India is almost a speciality of the Poona District. But, inasmuch as they will not carry far in good condition the cultivation, for which the tract is very suitable, cannot expand beyond a very small area. At the same time, the Bombay Presidency alone imports nearly five lakhs of pounds of dried figs from abroad each year, chiefly from the Persian Gulf, Afghanistan and Greece. The best among these figs are sold at Rs. 1-8 per pound in the months of August and September in the Bombay market, but if the Poona figs can be dried satisfactorily and put on the market, they can be sold at ten annas a pound and still yield a handsome profit, and will be in great demand, especially from June to September, when there is a scarcity of foreign figs.

In any case dried figs have a world market. The principal exporting centres before the war were Turkey (by far the largest), Italy, Greece and Algeria, while the large consuming countries were the United Kingdom, the United States of America, Austria-Hungary, France and Russia. To capture the foreign market is perhaps a far distant goal, but it is certainly well worth while to see whether good dried figs can be economically produced suitable for the Indian market. If this were found possible, the present area of figs in the Poona District (1,064 acres) would soon rapidly increase.

The Poona fig is a medium-sized, bell-shaped, light purple-coloured fig and is, in good samples, nearly six inches in circumference at the broadest end. The stalk is long and the apex flat. The skin is thin, ridged, slightly downy, and is easily removable. The pulp is rosy red. The seeds are soft and without a kernel. The average weight of the fresh fruit is one and a half ounces.

The dried figs which have been prepared from these fruits are not so sweet and aromatic as the first grade Smyrna fig, but their size, colour and the softness of the meat are very attractive. Their market quality is at least as good as that of any dried figs available in the local market, and is probably superior to all.

The process of drying and curing figs differs somewhat in different countries, largely on account of the differences in the cultivated figs themselves. They are extensively dried in Turkey in Asia, Greece, Italy, France, Spain, Portugal and Egypt and more recently in California. In Asia Minor and Greece, figs are only sun-dried on drying floors. In Italy, figs are split lengthwise, dried in the sun, dipped for a moment in boiling water, which is then drained off. In France they are exposed to the sun as in Turkey, and then after two or three days' exposure, they are sweated for forty-eight hours in boxes and again finally dried in the sun. In California fresh figs are treated with burning sulphur fumes. Salting of fresh or half dried figs is also regarded as an important operation in many centres, but its use with the Poona figs has not, in our experience, increased the market value.

A series of experiments with the drying of the Poona fig has led to the following process as suitable to them.

Well ripened figs are carefully picked. Careful picking is essential The contents of figs subject to careless picking always ooze out while drying, and attracts ants and flies during the drying process. Fresh fruits are then spread in single layers and exposed to moist sulphur fumes in a closed wooden box. The exposure to moist sulphur fumes bleaches the fruits and makes them semi-transparent. The fumigation, too, checks the growth of micro-organisms, which would otherwise spoil the fruits during the curing period. The simplest method of fumigating with sulphur fumes is to ignite flowers of sulphur below perforated trays, which are made to slide one above the other on cleats nailed to the sides of an ordinary closed wooden box. The lowest tray, which is at least eighteen inches above the bottom of the box, is moistened with water and does not contain any figs.

Numerous experiments with various modifications of the treatment lead to the conclusion that twenty to thirty minutes' exposure to sulphur fumes is essential to get tasteful produce. Longer exposure, however, encourages acidity which is undesirable. If the figs are not sulphured, the final colour is dark and unattractive, and a preliminary dipping in boiling water containing salt gave no advantage, for though the taste was good, yet the final colour was not very attractive and the figs took a little longer to dry.

Immediately after sulphuring in the manner described, the figs are exposed to the sun in open trays and turned over daily in order to get the fruit evenly dried and semi-transparent in appearance. If this operation is neglected, the bright appearance of the dried fruit is lost.

The months of April and May seem to be the best for drying figs in the sun, as there is then no fear of rain. Five days are needed for completing the drying properly, and the figs, if well dried, are pliable and semi-transparent, and are reduced to a little less than one-third the original weight. The moisture contents of the dried figs range between 17 and 22½ per cent.

Before drying is completed, figs are pulled flat as evenly and nearly as possible to economize packing space and to improve the market appearance. Neatly pulled figs take a circular shape with their eyes in the centre on one side and the stalk on the other. If these instructions are carefully observed, a product much superior to the commonly obtainable foreign figs can be put in the market. There is, in fact, great scope for developing a fig-drying industry in the Bombay Presidency.

As this industry does not require any capital outlay, at any rate when conducted by the small cultivators who now grow figs, it can be easily taken up by the villagers as a cottage industry, particularly when the price of fresh figs is very low, as is usually the case in the month of May and the first half of June each year.

—THE AGRICULTURAL JOURNAL OF INDIA.

Ideas for Small Capitalists.

Mineral Water Manufacture.

Mr. E. Lakkaraju Naidu, Kharagpur send to us the following :—

Mineral waters have been in use from time out of mind and the poineers of this industry were the old Romans. Now-a-days this industry is carried on in many cities and towns and there are still many places where its introduction is still required. The people all over have got acquainted with the use of aerated waters and possess the merit of bringing financial success to those who adopt the line.

Of the ingredients required for the above manufacture, the most important is carbonic acid gas (Carbon dioxide) for aeration. In a mineral water factory the gas is either made direct or purchased in iron cylinders which can be attached to the machine. For the small capitalist the latter procedure is recommended as it makes no difference. Carbonic acid gas is generally obtained by mixing sodium bicarbonate with sulphuric acid. This process of manufacture is much cleaner, quicker and econonic. For 1 cwt of soda, 17 to 20 gls of water and about 68 lbs. i. e. 3¾ gls of acid are used. The water should first be put in the generator, then the bicarbonate and finally the acid which should be added rather more slowly. The manufacture of the gas directly will work out 17½ % cheaper than purchasing the gas.

The following is the equipment of a small factory with an estimate to start with

	Rs.	As.
Single bottle machine	200	0
Gas with cylinder	28	0
Bottles 12, 10 & 6 ozs. at an average cost of Rs. 5 a doz. (2 gross)	120	0
Essences 5 lbs.	40	0
Colours 6 lbs.	15	0
Saccharine 1 lb.	7	8
Citric acid 5 lbs.	7	8
Lables	35	0
Sugar Java White 1 md.	18	0
Soda, washing	1	0
Measuring glasses, basin, funnel, brushes, enamelled bucket, spoon etc.	5	0
Hand cart	15	0

Staff necessary to run the factory.

1 bottler	Rs. 15 to 20 p. m.
1 male cooly	Rs. 12 ,,
2 female coolies	Rs. 8 to 16 ,,
1 boy	Rs. 5 ,,

The work of the bottler may be undertaken by the proprietor himself and the services of the boy may be dispensed with. The manufacturer should note the following points :—

AERATION.—This is a most important feature in the manufacture of aerated waters. Carbonic acid gas acts as preservative. This gas gives the beverage life and preserves it. The discovery is the foundation of mineral water industry. The better the waters are aerated the longer they will keep.

Imperfect bottling depreciates the quality. Before fiilling care should be taken that all atmospheric air is expelled from the generator, gasometer, cylinders, piping, etc. and also from the bottles by the operation of sniffing.

PRESSURE.—The pressure at which soda water is filled is 120 to 130 lbs. per sq. in and for syruped drinks 80 to 90 lbs. per sq. in. Care must be taken that the pressure be regularly maintained and the bottler should assiduously watch the pressure gauge. Soda water is filled in 12 & 6 ozs. bottles the latter going in the name of splits. The average cost of manufacture per dozen of soda is annas 2 while the wholesale rate is annas 6 a doz. The number of dozen to be manufactured depends upon the consumption.

Sweet Waters.—How syrup is made. Pure white sugar is added to the water which is boiled first. To make 1 gallon syrup 6 lbs. of sugar is dissolved in 3 pints of water when hot, citric acid is added and the solution is skimmed and filtered. Colouring is added and when the syrup is lukewarm, essences, foam, saccharine, are mixed. Lemonade the general drink under sweets is of no colour and the practical recipe is

Plain Syrup	1 gallon
Citric Acid	2 ounces
Soluble Essence of Lemon	¾ ,,

which appears to be the most convenient, economic and finest lemonade. 1 oz. of syrup is used for every bottle.

The average manufacturing cost of sweet drinks per dozen when the price of sugar is below Rs. 18 a md, is As. 8-6 and when below Rs. 22 a md. As. 11-6. The sale price per dozen is annas 12 to 15. The above calculations for soda and sweets include a margin of 3 per cent for breakages. The profit in soda is greater and a manufactory in a small town can sell 30 doz. of soda and 15 doz. of sweets in a day with ease. Hand cart is to be used to convey the waters to the retail vendors.

Essences.—Fruit essences sold in the market are mostly artifical and if the manufacturer is energetic he can make his own essences. Below is the table showing the composition of artificial fruit essences and giving the number of parts of each ingredient to be added to 100 parts of alcohol all chemically pure.

	Peach	Apricot	Cherry	Lemon	Apple	Grape	Gooseberr	Raspberr	Strawberr	Melon	Pine-appl
Glycerine	5	4	3	5	4	10		4	2	3	3
Chloroform		1		1	1	2					1
Nitric Ether				1	1			1	1		
Aldehyde	2			2	2	2	1	1		2	1
Acetate of Ethyl	5		5	10	1		5	5	5		
Formiate of Ethyl	5					2		1	1	1	
Butyrate of Ethyl	5	10						1	5	4	5
Valerianate of Ethyl	5	5								5	
Benzoate of Ethyl			5				1	1			
Enanthlate of Ethyl	5	1	1			10	1	1			
Sebacic Ether	1							1		10	
Salicylate of Methyl	2	2				1		1	1		
Acetate of Amyl								1	3		
Butyrate of Amyl		1						1	2		10
Valeriante of Amyl				10	10						
Tartaric Acid				10		5	5	5			
Citric Acid		1			1						
Succinic Acid				1		3	1	1			
Benzoic Acid			1				1				

Glycerine is found in most of the above to blend the different odours and to harmonize them. The average cost per lb. of artifical essences will come to Rs. 4 whereas we we buy at Rs. 7-8 to Rs. 9 a lb.

Essences and essential oils should be kept in a cool dark cup board, or other suitable place and never should be left uncorked or without stoppers, since in the first case by exposure to air and sunlight alcohol is lost and a portion of the essential ingredients are thus thrown out of solution causing the essence to become cloudy or even to show a deposit or separation and in the second case oxidation may take place causing great deterioration in flavour and aroma. The best temperature suitable for storing essences is between 50 and 60°F. It is also important that the temperature should not be much lower as sensitive cold is also liable to become turbid.

Fruit Syrups.—In the summer season, when there is a great demand for fruit syrups, high class fruit syrups can be made with the same kind of syrup as is done for the manufacture of aerated waters. The whole difficulty lies in the cooking of the sugar syrup which has to keep for years together without spoiling.

Syrup being the solution of sugar and pure water care should be taken to employ only the best refined sugar which will lessen spontaneous decomposition and become perfectly transparent with little trouble of clarifying. When however impure sugar is used clarification is always necessary and is not economic. Water may be used and the scum removed from time to time. As soon as the syrup begins to simmer it must be removed from the fire, allowed to stand a little and filtered through a clean flannel.

The proper quantity of sugar is 2 lbs to every pint of water. This proportion has an allowance for the water lost in evaporation and is best calculated to produce syrup of proper consistency and possessing good keeping qualities. In a perfect syrup water contained in 30 parts of sugar is 15.5. Sugar is mixed with water and little heat is applied. Syrups are sufficiently boiled until when a quantity taken up in a spoon pours out like oil, or a drop cooled on the thumb nail gives a proper thread when touched. This can also be tested with the help of a hydrometer.

Essence and colour are mixed to the syrup which is then bottled and corked. 1 oz. of essence is used for 12 quarts of syrup and colour depends on the taste of the public. Corks are first soaked in hot water before use The bottle is wrapped with a wet cloth or sponge, capsuled and labelled and is then ready for marketing.

The manufacturer's price will never exceed Rs. 8-8 including advertisement charges 10 per cent A profit of Rs. 2 per dozen can be made.

Artifical Ivory.

Keki H. Dinshaw, Esq., The Retreat, Bhongir, Deccan sends us the following :—

This is not a very common formula like that of a soap. It is an interesting one and can be worked out by any student. I think up to now there is no formula existing, of ivory. The ingredients may be obtained at a chemist's shop. After the manufacture of ivory the student will not be able to shape different kinds of buttons, hairpins, tops of ladies hat pins, plectrums, etc. so he can easily sell them to persons who are highly skilled in that work. The way to prepare ivory :

Mix a quantity of Isinglass and Brandy, and make a paste, afterwards add powdered egg shells (very finely ground). Give it any desired colour—then oil the paste in the mould until dry when its appearance strongly resembles ivory. This kind of ivory can be even sold to jewellers, etc. Earnest workers may earn Rs. 3 to 4 daily. Now-a-days the need of such kind of ivory is very great.

Small Trades & Recipes.

Rubber Balls.

Toy balls of hollow rubber may be made by the following process in which those who are adept in the manufacture of rubber hand-stamps are particularly to succeed.

First of all thin sheets of prepared rubber are cut into strips of double convex shape. The edges of the strips are moistened with a preparation of rubber and naphtha, by which they are joined firmly together, three of the strips being used for one ball. Before the last opening is closed, a small quantity of ammonium carbonate is put inside. This chemical, when subjected to strong heat, will make the rubber expand and fill out the ball mould. The opening is then closed with the adhesive mixture, and it is placed in an iron mould of the size and shape of the ball desired. The moulds are packed into frames, in which they are kept in place in the frame by iron rods along the side, and when the frame is full, iron plates at the end are screwed down tightly upon the moulds to hold them in place. Though these iron plates are about three quarters of an inch thick yet the moulds are bent by the expansive power of the mould. Great care should therefore be exercised in fixing the moulds properly as otherwise the loose part may fly off with a loud explosion, spoiling the work. The rest of the work is achieved by heat. When the moulds are opened, they contain the perfect round balls, with no mark of the places where the pieces were placed. The slight ridge made by the mould is ground off by a stone used for that purpose and the ball is complete

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Preserving Ginger.

The following method of preserving ginger is said to be in vogue in China.

The ginger is washed, and the skin is scraped off. It is then punched with forks and washed in rice water, i. e., water left after washing rice. This is to improve the colour of the ginger. It is then boiled in three or four changes of refined sugar and water for one or two hours, until it is properly soaked, and then put in barrels and covered with syrup. In the case of dry preserved ginger, the wet ginger is strained till dry ; dry sugar is placed on bamboo matting, and the ginger is rolled in it till it is coated with sugar. Stem ginger is the young and tender shoots on the roots. Cargo ginger is what is left after cutting off the stem.

Marking Ink.

Add caustic alkali to a saturated solution of cuprous chloride until no further precipitate forms ; allow to settle, draw off the liquid, and dissolve the oxide in the smallest quantity of ammonia that will absorb it. Mix with about 6 per cent. of gum dextrine.

SCIENTIFIC & INDUSTRIAL TOPICS.

Cinema Picture in Perspective.

Realistic perspectives in screen pictures are said to have been obtained successfully in a double film taken with two cameras and viewed through an instrument somewhat like a stereoscope. In filming the scene, the cameras are adjusted to positions corresponding to the left and right eye. The two films are then combined in one and projected through a machine with a double opening with the aid of the stereoscopic instrument held to the eyes, this double film is transferred as a single image that seems to jump from the screen and stands out with life-like reality.

Photographing the Inside of Body.

According to a Paris report two well-known physicians have been able to obtain photographs of cancers inside the body by the use of radium emanation added to blood serum. The new method involves withdrawing from the body a certain amount of blood. From this blood the serum is obtained. To this blood-serum, a definite dosage of radium emanation is added. The radium treated blood-serum is then injected into the body. The radium emanations tend to locate in the most rapidly growing tissues, such as tumors of a malignant character like cancer. When a photograph of the body is made, the presence of the radium emanation manifests itself on the photographic plate.

Phonograph for the Deaf.

With the aid of the "dentiphone" invented by an American gentleman, the pleasures of the phonograph are extended to the deaf. The instrument is a simple one. One end of an attachment carries the stylus which rests in the groove of the phonograph record, while the other is formed into a mouthpiece to be held between the user's teeth. The tones of the record then become audible to him, through the vibrations of the bones of the head which are set up. Many deaf people may be enabled to hear ordinary conversation through any instrument that brings about such vibration.

Colour Photographs of Microscopic Plants.

The possibility of taking colour photographs of microscopic plants by the light emitted by the plant themselves after stimulation by a strong beam of light has been demonstrated by American scientists. Plants contain a considerable number of pigments which have the property of fluorescence, a property due to the ability of the pigment to change the wave length of the blue-white part of spectrum into the longer wave lengths—green, orange and red. In the case of green pigments, the result of this property is to produce red light even though no red light is supplied.

Facts About the Microbe.

Some very interesting facts regarding the microbe are published in a scientific journal. Bacteria, germs or microbes, are so small that fifteen millions of them would scarcely balance an ounce weight. The many kinds of bacteria fall into three groups, according to shape. The spherical ones are called *cocci* ; the red-shaped ones, *bacilli* the corkscrew like ones, *spirilla.* They are all colourless. An average sized bacillus measures about one-twelve-thousandth of an inch in length.

Some of the bacteria kill us, yet we cannot possibly do without them. They do not themselves injure us. It is the poisons they manufactured and secrete which give us disease. These poisons are called "toxins".

Primitive Broadcaster.

The broadcasting drum of the Tucaño Indians of South America is a hollowed-out section of a tree trunk with holes perforated along the length of one side. The note given out on pounding, which varies with the length of the log and the number of holes, identifies the source of the sound. This primitive apparatus has been used for ages for signalling, and, with a well understood code, messages are transmitted by the sound from village to village over astonishing distances, the range having been stated to be about 80 miles.

Hearing the Printed Word.

An important feature of a recently patented German device for making printer's ink conduct electricity is that, by modifying it, paint and inks can be prepared which conduct electricity in varying degrees, As most people know, variation in conductivity is the basic principle underlying the telephone. It is proposed, therefore, to prepare strips of paper printed in symbols corresponding, for example, to the Morse dot and dash system. Such printed strips can then be used, by means of simple electrical apparatus, to make and break contacts so as to sound a bell or a buzzer, so that a blind person familiar with telegraphy could literally hear the printer's ink talking to him.

The essential feature of this patent is said to consist in the fact that the particles of metal are first mixed with the binder, as for example with printer's ink and that this binder is hardened as soon as possible after the cohering or welding process mentioned takes place. This hardening of the binder prevents the metal particles from being shaken apart again, as they are in the ordinary coherer.

The Morse alphabet can be represented by printing strips of paper with inks of varying degrees of conductivity. Above this writing a contact is placed at the point of interruption of an electric circuit. When the contact meets a conducting sign, the circuit is closed and a buzzer is sounded. Or, if it be preferred, instead of the Morse alphabet different musical notes may be made to correspond to different letters of the alphabet.

Invention in Textile Industry.

One of the most outstanding features in the British textile world, destined to have far reaching effects in the manufacture of woollen and cotton goods, is the introduction of a new automatic 'weft feed for looms. The invention has been well received and demonstrations have proved it to be as useful for producing worsted textiles in plain one-coloured cloths as for cotton goods. The invention is a weft-replenishing mechanism which can be fitted to the side of any ordinary loom, and all that is necessary is to keep it supplied with full bobbins. A number of factories have already been installed with it, and with further improvements it will be possible for the new device to use weft of different colours. The cost of production, it is maintained, will be greatly cheapened.

Sponge Iron.

A new process for the production of sponge iron has been developed in U. S A. Sponge iron, owing to its porous structure and consequent exposure of an extremely large surface of metallic iron, is especially adaptable to the precipitation of copper, lead, and other metals from their solution. The development of a process by which sponge iron may be made cheaply from iron ore and low-grade coal and afterwards converted into iron and steel products by treatment in the electric furnace would be of especial economic importance to the Pacific Coast région of the United States, a territory remote from the larger iron and steel-producing centres, but endowed with cheap electric energy. The possibility of making sponge iron and converting it to steel without passing through the stage of pig-iron production has been suggested from time to time. The production of steel from sponge iron has theoretical advantages over present standard methods. Moreover, the production of both steel and pig-iron from sponge iron has economic advantages in certain localities. The fact that both electric melting and sponge-iron production processes can be conducted economically on a small scale makes such a proposed process particularly advantageous in communities that do not consume much iron or steel. There is some hope that sponge iron can be briquetted and melted in the open-hearth steel furnace without too much oxidation. If this could be accomplished a much larger field of usefulness would be opened up for cheap sponge iron. In the new process referred to almost any type of iron ore is satisfactory for the production of sponge iron. The process consists in passing a mixture of iron ore and coal through a rotating kiln heated at one end to a temperature sufficient to convert iron oxide to metallic iron, discharging, cooling and separating the sponge iron from the residual coke and siliceous material in a magnetic separator.

The Hydrautomat.

To utilise a fall of water in order to raise water much higher than the height of the fall seems an impossibility. Nevertheless it has been achieved by a British inventor, and without the use of any power except that supplied by the falling water. The action is entirely automatic as the name suggests and there are no moving parts except the sluices. The apparatus consists of a series of tanks and tubes built into the form of a tower suggesting a kind of water ladder. The paradox is, only appararent, as the volume of water raised above the level of the fall is less than that flowing over the weir, although the efficiency is surprisingly high. The apparatus is expected to have a wide field of usefulness in irrigation especially where there exists a head of water that cannot at present be utilised in any other way. Another advantage is that a fall of dirty water can be used to lift clean water or any other fluid from another source. The invention has been patented in all countries and astonishment has been expressed that this discovery was not made by the Ancients, as it owes nothing to modern mechanical progress. It is, in fact, a supremely clever application of the natural mechanism of water and air, by which alternate suction and pressure is set going in the series of tanks, and continues for ever,—or so long as the stream does not dry up.

FORMULAS, PROCESSES & ANSWERS.

Bottle-Capping with Gelatine.

1326 N. V. R. K. R., Nagaram. Wants process of bottle-capping with gelatine.

(1) Soak 7 lb. of good gelatine in 10 oz. of glycerine and 60 oz. of water and heat over a water bath until dissolved ; the mixture can be coloured with aniline dye. Store the resulting mass in jars. For application melt the mass by gentle heat and dip in it the cork and portions of the neck of the bottle. It will set very quickly.

(2) Mix 1 oz. of gelatine, 1 oz. of gum arabic, and 20 gr. of boric acid with 14 fluid oz. of cold water. Stir occasionally until the gum is dissolved. Heat the mixture to boiling point, remove the scum and strain. Then stir in a mixture of 1 oz. of starch and 2 fl. oz. of water until a uniform product results. The mass can be coloured with aniline dye. Before using it must be softened by the application of heat.

Removing Rust from Iron.

1637 V. K., Cuttack. Writes, how to remove rust from iron.

In cleaning iron that has become very rusty, coat it with paraffin and then scour while wet with coarse sand. A wire scratch-brush will help to remove the rust more readily. When all the rust is off, wash in strong soda-water and silver sand. If the iron is very rusty go over it with an old file before putting on the paraffin.

Book Edge Decoration.

1831 P. S., Rawalpindi. Writes, please give some hints for decorating book edges in binding.

Book edges may be decorated in several ways. They may be coloured, sprinkled, marbled or gilded. The cheapest and commonest methods are sprinkling and colouring. In plain colouring the colour is applied very thinly with a sponge. Then follow successive applications as each coat becomes dry, until the desired shade is obtained. Sprinkled edges are effected with a. brush which has been dipped in a pigment usefully red. The brush is struck forcibly against a stick above the book so that a sprinkling of colour falls upon the edges.

Edge-marbling is a difficult process and requires careful training. A large shallow trough is filled with a solution of gum tragacanth or gum dragon of a consistency of buffalo milk. Each colour that is to form part of the design, having been ground, mixed with a little ox gall, is sprinkled sepatately with a brush over the surface of the gum solution, every spot of colour being kept intact by the ox-gall. The colours are then skilfully manipulated with combs having teeth of different widths, until the desired pattern is formed on the ductile fluid, when the edges of the book are dipped into the solution, and receive the coloured design.

One of the most elegant form of edge-decoration is gilding which is not merely attractive but is also useful in that it helps to the removal of dust deposited on the edges. For this purpose the book is placed between two gilding boards and screwed in the lying press, with the edge to be gilt level with the top of the press. The edge is made perfectly smooth by scraping with a steel scraper and rubbing with fine glass-paper. After this process red chalk in solution is applied with a sponge. Glaire is afterwards applied and strips of gold leaf laid on evenly all over the edge. When dry the gold is burnished with a tool tipped with an agate.

Casein from Soy Bean.

2311 S. M. P., Kalimpong. Asks "Can casien be prepared from soy-milk ?"

The extraction of the casein for industrial purposes is obtained from the meal, after the extraction of the oil from the soy-bean. The cake coming from the oil press is ground under mill stones with cold water and the homogeneous milky material thus obtained, after kneading in the vats, is passed through a filter press. The residue is subjected to the same process and a second lot of milk obtained. The milky fluid is poured into cylindrical wooden vats and heated to the boiling point by tinned copper worms. To each 1000 litres of liquid 1 kilogramme of calcium sulphate is added. This causes a precipitate of the vegetable casein which is collected on cloth filters. It is now dissolved in dilute soda lye, weak enough for the reaction to be neutral or slightly alkaline. Then after filtering it is precipitated with acetic acid, left to evaporate in the open air, and the precipitate dried at a low temperature. The soy bean casein is a yellowish powder closely resembling animal casein and the former can be put to the same uses as the latter.

Caustic Lye for Mercerisation.

1768 S. D. S. C. Co., Hyderabad. Are willing to know the best conditions under which caustic lye for mercerisation is prepared.

The proper conditions for carrying into practical operation the mercerising process are simple and easily realized. Caustic soda is the most suitable and convenient reagent for bringing about the hydration of the cellulose ; and it has been found that a solution of density between 60° and 70° Tw. gives the best results. Caustic soda solutions of less density than 15° Tw. have scarcely any action on cotton : the maximum effect appears to be produced by a concentration of about 60° Tw.

Temperature plays an important part in the mercerising process. The temperature at which the reaction is carried out should not be higher than the usual atmospheric degree ; in fact it has been recommended to lower the temperature of the caustic soda solution by the addition of ice. At elevated temperatures caustic soda appears to exert a destructive effect on cotton. Beyond a certain temperature the mercerising effect rapidly diminishes and at the boil it is scarcely appreciable. The best results appear to be obtained when the temperature is maintained at 20°C or lower.

In carrying out the process in practice, the mercerising vats are fitted with cooling devices, which cool the liquor (of about 25° B strength) down to 10-16°C. This cooling is necessary to counteract the heat generated in the process itself, and also that produced by the chemical action of the liquor on the impurities in the material.

Minerals of India.

2003 C. A. A. A. K., Cumbun. Wants us to publish where iron, coal, tin, zinc, petroleum are met with in India.

Coal in India is very unevenly distributed, the majority of the coal fields belonging to Gondwana system. Raniganj and Jhariah are the two main fields of production. Wardha and Pench Valleys in the C. P. and the Umaria mine in the Rewah State also produce coal.

Petroleum in India is produced in Burma and Punjab and Beluchistan. Iron ore is mined mostly in Bengal, Bihar and Orissa and the Central Provinces, although it is found in other parts of India. The principal companies working the ore are Tata Iron & Steel Company in Mayurbhunj State, Bengal Iron Company in Singhbhum and Indian Iron and Steel Company in Gua.

Tin mining is done only in Burma chiefly in the districts of Tavoy and Mergui, where tin is obtained. Zinc ores in like manner are found in Burma. These are found in association with the silver lead ores of the Bawdwin mines in the Northern Shan States of Upper Burma. Among the remaining minerals rank copper, which has been found in the Bawdwin Mines of Upper Burma. Existence of large deposits of copper in Sikkim has been established but neither of the two sources has been worked commercially.

Cleaning Celluloid.

1702 S. A. U. B., Sargadha. Wants recipe of cleaning celluloid.

Celluloid articles are cleaned by rubbing with a woollen cloth and a little tripoli and polishing with a clean woollen rag.

Stereotyping Process.

2258 G. S. K., Deogad. Is willing to know how stereotyping work is done.

The process of stereotyping is simple. A page of any work proposed to be stereotyped is set up with moveable types in the ordinary way. A plaster cast is then taken from it, which, being first dried, is immersed in fluid metal. The cast or plate, after being sufficiently cooled, is then withdrawn from the mould, and at a subsequent stage carefully examined with a view to removing any imperfections previous to its being printed from. The plaster used for forming the mould is pulverised gypsum, mixed with water to the consistence of cream. After the form of types has been surrounded with a brass frame, and slightly oiled on the surface, the fluid plaster is poured upon it, and, by the application of a brush made to fill every cavity of the letters, the superfluous portion being scraped off. When the plaster has set sufficiently hard, it is, by means of the frame, lifted off the face of the type and detached from it. It is then baked to dryness in an oven; and when quite hot it is placed in an iron box, or casting pot which has also been heated in an oven. The box is now plunged into a large pot of melted type metal and kept about ten minutes under the surface, in order that the weight of the metal may force it into all the finer parts of the letters. The whole is then cooled, the mould is broken and washed off; and the back of the plate turned smooth on a lathe or planed by a machine.

Cleaning Alabaster Figures.

1341 S. B. S., Khagra. Enquires how to clean alabaster figures.

Strong soap and water, containing a little washing soda or ammonia, is good for cleaning alabaster. If badly discoloured, make a paste with quicklime and water, cover the article well with it, and let it remain all day; wash off with soap and water, rubbing thoroughly any stains. Another method is to apply dilute hydrochloric acid, having previously washed off dirt and grease. The best method, however, is said to be the immersion of the articles for some time in milk of lime, then washing in clean water, and, when dry, dusting with a little French chalk. If the articles are very greasy, use a solvent such as petrol or benzene.

Cleansing Rust.

2301 K. P. G., Hubli. Enquires how fine iron and steel articles can be cleansed from rust.

For this purpose, mix 10 parts of tin putty, 8 of prepared buck's horn, and 25 of spirit of wine to a paste. Cleanse the articles with this and finally rub with soft blotting paper.

If the iron is very rusty pour a mixture of 1 part of diluted hydrochloric acid and 1 of water over it, rub with it, wash, dry, brush it with oil, and allow it to lie for a few days. It is then cleansed in the manner as stated above.

Dyeing with Sulphone Cyanin.

1742 P. T. R., Agra. Enquires about the use of sulphone cyanin in dyeing.

These azo-dyestuffs are chiefly used for dyeing wool in a feebly acid bath, and are best dyed with the addition of 3 to 5 per cent of ammonium acetate and 10 per cent Glauber's salt: enter lukewarm, heat within half an hour to the boil and boil one hour, exhausting the bath, if necessary, by adding some acetic acid.

Sulphone cyanin yields full, fairly bright medium blues and navy blues; the brand G dyes the most greenish shades, the others are considerably more reddish. The colours are distinguished by excellent fastness to light, washing, milling, acids, alkalies, and stoving, and are very useful for loose wool, yarns, and piece-goods which do not require severe steaming. They also serve well in the one-bath method of union-dyeing with direct cotton colours for shading the wool, since they dye very well in a neutral bath. Silk is dyed with the addition of ammonium acetate or in boiled off liquor acidulated with acetic acid, deep blue shades of very good fastness to light being obtained.

Cleaning Gloves.

1543 B. L. M. M., Jubbulpore. Wants a process of cleaning gloves.

To wash cotton or chamois gloves make some good warm suds, put gloves on your hands and scrub with a soft brush, rinse well in warm water, and keep on until nearly dry, pressing on a bath towel. Pull off gently and lay on a towel to dry.

To clean white kid gloves take a couple of handfuls of bran, damp well with petrol, pull on gloves and rub bran and petrol well all over them. Take off very gently and hang in the air until all trace of petrol is gone. Keep well away from the fire during the process of cleaning. A good rubbing with magnesia, or fullers' earth is also a good dry cleaner.

Black kid gloves may be renewed by touching the white spots with a feather dipped in olive oil to which a few drops of ink have been added.

Antiseptic and Disinfectant.

1574 W. S. P. K., Raigarh. Requests us to differentiate between an antiseptic and a disinfectant.

An antiseptic is a substance which prevents the growth of germs, while a disinfectant is one which kills germs. A disinfectant, therefore, is only required to act for a short period, while an antiseptic may be required to act for a comparatively long period. The one substance may be both an antiseptic and a disinfectant depending on the strength of the solution, as, for example, formaldehyde, or the substance may be too weak to disinfect, but still be able to prevent the growth of organisms, for example boric acid, or the substance may be useful as a disinfectant but not as an antiseptic, either because it loses its activity when in contact with living matter, for example potassium permanganate and chlorine, or it is too poisonous to be applied for any length of time, for example carbolic acid.

Uses of Tapioca.

1193 K. P. R. V., Lucknow. Writes, 'What are the uses of tapioca ?'

The starch is used for practically all purposes for which other starches are employed—in the manufacture of glu-

Chief Agent in India and Burma.
MR. A. P. GHOSE, M.S.C.I. (London).
Consulting Match Expert.
42, Beniapukur Road, Entally, Calcutta.

cose, alcohol, for laundry purposes, for sizing yarns and fabrics, and for the manufacture of dextrin or British gum. It is interior to rice starch for laundry work, but superior to either maize or potato starch, giving a smoother surface and a finer gloss. For sizing cotton it is inferior to other starches, its adhesive properties being somewhat buble, but for medium or heavy sizing it is good when mixed with maize starch or wheat flour. For biscuit manufacture—owing to its fine white colour and freedom from odour—tapioca flour is greatly appreciated.

Marble Cement.

1877 R. S. M., Allahabad. Desires to know how broken marbles can be cemented.

To cement broken pieces of marble first of all take 1 lb of gum arabic and render this into the form of a thick mucilage. To this then add powdered plaster of Paris 1½ lbs. and sifted quick lime 5 oz. These are then mixed together intimately. Before applying the mixture the pieces of marble are to be heated.

Book Binding Cover.

1880 N. K. P., Calcutta. Wants to be informed regarding the manufacture of book-binding cloth.

Book covers are now made in endless strips by using a composition of oils solidified by mixture with fibrous substances and colouring matter and pressed through embossed rollers, which produces a resemblance of morocco, but with sharper outlines and capable of being washed. First of all an oxidised oil is prepared by applying a drying oil to a tissue and exposing to the action of the air, and when dry spreading on repeated coatings until the enamel thus formed is about ¼ inch thick. The solid oil is then ground together with the tissue upon which it has been formed. Then a mixture is made consisting of 100 parts of oxidised oil, 10 of rosin, 10 of copal, 20 of white lead, 10 of colouring matter, 20 of saw dust and 10 of paraffin wax. These substances are intimately mixed in a horizontal cylinder heated by steam. The cylinder is provided with a shaft with inclined wings by which the contents are carried forward and pressed out through an aperture in a similar manner as the clay in kneading machine. When the mixture is ready it is spread upon a basis of textile fabrics but principally consisting of paper combined with a fabric. A suitable agglutinant consists: 12 parts of oxidised oil, 1 of copal, 1 of rosin, 24 of ochre, and 2½ of turpentine. The plate produced by the machine is afterwards divided in suitable pieces and the covers, if necessary, can be stiffened with paper board pasted to the back.

Calcium Sulphide.

2224 B. N. D., Cuttack. Enquires how calcium sulphide is made.

Calcium sulphide can be made by heating pure lime with sulphur. It can also be prepared by calcining 25 parts dried gypsum with 4 parts lampblack or powdered charcoal in a covered crucible. It forms a white mass, insoluble in water: after exposure to light, it is luminous in the dark, and is therefore used as a luminous paint of match boxes. A number of higher sulphides of calcium are formed by boiling milk of lime with sulphur but little is known about them.

Oil Cloth.

1971 B. K. M., Dubrajpur. Requests us to enlighten him regarding the process how oil cloth is prepared.

Oil cloth consists simply of fabrics coated with linseed oil, whiting, and pigment and are printed in oil colours with the following ingredients. For red, use red oxides, or, in the case of bright inlaid colours, permanent lakes; for blue, use ultra blue; for green, chrome green; for white, white lead and lithophone; for yellow, chromes; and for black, vegetable black.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of INDUSTRY are invited. Enquiries or replies from our experts will be published free of charge Questions are not generally replied by post.]

1798 B. M. T., Madugole For particulars of Santi Niketan write to the Principal Santi Niketan, Bolepur, Dt. Birbhum. Popular Mechanics' Magazine is published at Chicago, U.S.A.

1801 R. S. I., Erachikulam. For balsam fir enquire of Mr. S. N. De, M.Sc., P O. Box 7851, Calcutta. Rubber stamp making outfit may be had of Messrs S. C. Dutt & B. K. Dutt, 100, Durga Charan Mitter Street, Calcutta. For books on rubber stamp making enquire of Messrs Chakravarty Chatterjee & Co. Ltd, 15 College Square, Calcutta. To secure agencies please write to the respective parties direct. Envelope making machines may be had of Calcutta Industries Ltd, 71, Canning Street, Calcutta. Important addresses are often sold at handsome price.

1802 A. G. W, Trivandrum. For rate of subscription you may write to manager of the journals you mention. Refer to 1801 above.

1803 A. C. D, Kaliavadi. The address you require will be found elsewhere in these columns. For periodicals of Germany write to the editor, Ubersee Post, 10 Solomonstrasse, Leipzig and Export & Import Review, 38-39 Krausenstrasse, Berlin; both of Germany.

1804 B. P. I., Banda. Printing machines may be had of K. Banerjee, 133, Canning Street; A. Lall & Sons, 15, Boloram Bose's 2nd Lane, Puddapukur Road, Bhawanipur and Ashutosh Addy, 16, Lower Chitpur Road; all of Calcutta. Oil crushing machines may be bought of Burn & Co., 7 Hastings St. Calcutta. Other machines you require may be supplied by Oriental Machinery Supply Agency Ltd., 20-1 Lal Bazar Street, Calcutta.

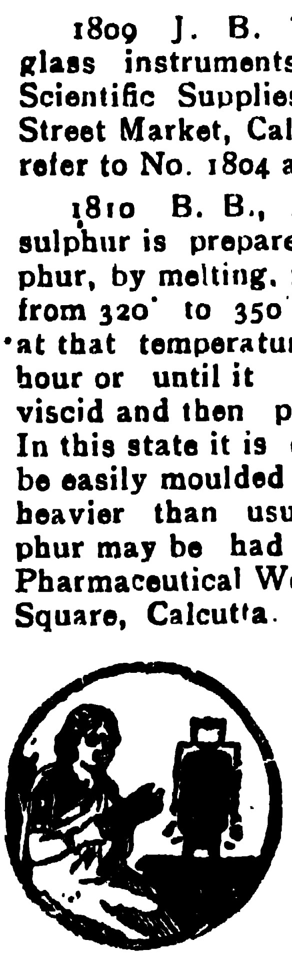
1806 R. S., Rawalpindi. You may read books on identification of handwriting to be had of Thacker Spink & Co, Esplanade East, Calcutta.

1807 M. M., Patna. For rice milling machines enquire of Marshall Sons & Co., 99, Clive Street, Calcutta. Oil engine may be had of Macbeth Bros & Co. Ltd, 1-2, Hare Street, Calcutta.

1808 H. S, Manora. Collapsible tubes may be supplied by Venesta Ltd. Great Tower Street, London E. C3 and Betts & Co. Ltd, 1 Wharf Road, City Road, London N O. 1. Process of extracting colour from leaves appeared in October 1921 issue.

1809 J. B. T., Kurungala. For glass instruments enquire of Bengal Scientific Supplies Co., 29 College Street Market, Calcutta. For machines refer to No. 1804 above.

1810 B. B., Amraoti. Amorphous sulphur is prepared from sublime sulphur, by melting, it increasing the heat from 320° to 350° F, and continuing it at that temperature for about half an hour or until it becomes brown and viscid and then pouring it into water. In this state it is ductile like wax, may be easily moulded in any form, is much heavier than usual. Amorphous sulphur may be had of Bengal Chemical & Pharmaceutical Works Ltd., 15 College Square, Calcutta.



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Belgaum, M.S.M. RY.

1811 K. L. S., Delhi. Formula of washing soap appeared in May 1924 issue. You may consult Soap Making by Mr. George Hurst.

1813 H. K. S., Madras. There is no such company in India.

1814 M. K. D., Rajkot. Depilatory is a substance used for removing hairs.

1815 M. D. M., Badulla. You may mix white oil with coconut oil to make it thinner. Melt the ghee first by applying gentle heat and put some leaves of citrus lime in the ghee, when cool strain through a piece of cloth. This will purify the ghee to a certain extent. Astrological books may be bought of Chirological Society, 54 Amherst Street, Calcutta. To avoid fermentation of jams you may add a few drops of 60. o. p. alcohol. Process of deodorising coconut oil will appear in an early issue.

1816. F. H. B., Bombay. For shipbuilding and railway engineering you may prosecute your studies in mechanical engineering line. There is no arrangement for training Indians in the marine engineering. There is ample field for oil technology in India and it is taught at the Foreman Christian College, Lahore.

1819 C. R. K. B., Madura. Process of preparing rose water direct from rose appears in the last issue.

1820 V. R. C., Vellore. To communicate with any querist write him by number and initials under care of INDUSTRY when your letters will be duly redirected.

1821 G. D. K., Delhi. Your query is not in our line.

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ORIGINAL HOMEO PHARMACISTS
42, Strand Road, Calcutta.
Dealers in Boericke and Tafels.
Originals MACHINE MADE Dilutions.
CATALOGUE FREE ON APPLICATION.

1823 R. D. J., Almora. Wants to buy black rubber tube of German make.

1824 A. K. R., Kiratpur. For matches of required brand enquire of H. Rashid & Co, 15 Zakaria Street, Calcutta. Corks of all sorts may be had of Satya Charan Paul, 194 Old China Bazar Street and P. S. Dutt & Bros, 8 Ezra Street; both of Calcutta. Toys may be had of K. B Nan, 233 Old Chinabazar Street, Calcutta. Novelties may be bought of Singh Sarkar & Co., 105 Harrison Road, Calcutta. The required machines may be supplied by Oriental Machinery Supply Agency Ltd, 20-1 Lall Bazar Street, Calcutta.

1830 B. V. S, Thakurdwara. The following are some gold mining companies of India: (1) Deccan Gold Fields Development Co. Ltd, Yadgeri Deccan; (2) North Anantapur Gold Mines Ltd, Morriston, Anantapur; (3) Balaghat Gold Mines Ltd, Coromandel, Dst. Kolar; (4) Mysore Gold Mining Co Ltd, Marikuppam, Mysore State and (5) Eastern Development Corporation Ltd, Oorgaum, Dst Kolar.

1831 P. S, Rawalpindi. You may apply the Principal Govt. Weaving Institute, Serampore, Howrah Formula of making the sides of books golden appears elsewhere in this issue.

1832 G. H. B., Bahawalpur. For essences used in aerated water enquire of B. K. Paul & Co, 1-3 Bonfield's Lane, Calcutta. For the required book write to Chakraverty Chatterjee & Co, 15 College Square, Calcutta. Soda water bottles may be had of Gulam Hussein, 22 Harrison Road, Calcutta.

1835 D. B. P., Shivrajpur. The platinum crucible already spoiled will not most probably be brought back to its original state.

1836 P. C. S., Pangashi. Please refer to No. 1820.

1837 R. L., Jodhpur. Your idea is quite practicable.

1839 G. T. R., Hyderabad. For gunnies enquire of Adamjee Hajee Dawood & Co. Ltd., 55, Canning Street, August & Co. Ltd., 3, Clive Row and Dupelia & Co, 21, Canning Street; all of Calcutta.

1840 K. L G. L., Mhow. Your enquiry is receiving our attention

1841 B. B. C., Islampur. For vinum. grapes enquire of Martin & Horris, 8, Watch Street, Calcutta.

1842 G. A. S. I., Travancore. You may go through Match Industry by Mr. K. C. Sen to be had of Bhawani Engineering & Trading Co., 122-1, Upper Circular Road, Calcutta.

1844 D. E. N., Myinbu. For cutting precious stones enquire of Benode Behari Dutt & Co., Mercantile Bldg., Lall Bazar, Calcutta. You may consult W. C. Gummit, B.Sc., Ranchi, B. N. Ry. For analysis you may write to R. V. Briggs., 8B, Lall Bazar Street, Calcutta.

1845 B. K. B., Ganjam. For coloured paper enquire of Ghosh Bros., 63J, Radha Bazar Street, Calcutta. Fishing hooks may be had of S. Roy & Co., 11-1, Esplanade East, Calcutta.

1846 P. R. G., Chicacole. Potash chlorate may be bought of Orient Fire Works Co, 85-1, Upper Circular Road, Calcutta.

1847 M. R. S., Mangalore. Magical apparatus may be supplied by Hamley Bros. Ltd, Magical Palace, 35, New Oxford Street, London W. C2; The Magical Co., Jhansi; Magic House, Nagpur City and R. O. Verma, P. O. Mohendru, Patna.

1849 P. S, Nellore. Your enquire being in the nature of an advertisement should not be dealt with in these pages.

1851 C. N., Laitkynsew. Formula of tooth powder appeared in June 1922 issue.

1852 E S., Mangalore. Silk of all sorts may be had of Pohoomul Bros., 33, Canning Street, Calcutta.

1853 S. B, Delhi. For enamelling cycle parts you are referred to an article on stove enamelling that appeared in September 1921 issue of INDUSTRY.

1854 S. N. B., Muttra. For calico-printing machinery enquire of Asa Lees & Co. Ltd., Soho Iron Works, Oldham and Brooks & Dessey, Union Iron Works, West Gorton, Manchester; both of England.

1855 S. B. S. M., Rohtak. Wants to be introduced to manufacturer of thread balling machine that manufactures 12 balls at a time.

1857 A. S. S., Garwal. Dentistry is taught by the Calcutta Dental College and Hospital, 261, Bow Bazar Street, Calcutta. Formula of hair curling lotion appeared in September, 1924 issue. For hair oil please go through Hair Oil Manufacture published from Industry Office. Process of removing small pox marks appeared in October 1921 issue.

1858 S. D. J., Dhankuta. For perfumery instruments enquire of P. Mukherjee & Co., 29-30, College Street Market, Calcutta. For the required machines write to the Oriental Machinery Supply Agency Ltd., 20-1, Lal Bazar Street, Calcutta.

1859 S. N., Wazirabad. Success in any business depends upon various things. However, cigarette manufacture on a small scale will not be profitable. For cigarette manufacture you will have to use big machineries. The required machines may be supplied by J. C. Muller & Co., Dresden A 24 U, Dresden, Germany. Indian tobacco may be used in cigarette manufacture. A series of articles on cigarette manufacture appeared in the 11th volume of INDUSTRY.

1861 K. L., Cawnpore. Formula of hair curling lotion appeared in the last September issue. German goods of various descriptions are imported by Singh, Sarkar Co., 105, Harrison Road, Calcutta. Messrs K. B Nun, 233, Old China Bazar, Calcutta deal in toys.

Limitation of Family

Third Ed. 5 Portraits, 55 Engravings,
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A comprehensive and Confidential Treatise. Every parent desiring to regulate the number of children according to his health and means will find it a god-send, ask for table of detailed contents which will be sent free. K M DAS & CO., 29-1, Telepara, Sampooker St, Calcutta.

1862 S. S. S., Jubbulpore. You may oxidise the impurities from the silver extracted from fixing bath in photography.

1864 M. G. R. R., Mysore. An article on the preparation of Jintan, Sensen, etc. will be published in an early issue.

1866 M. G. R., Mysore. Pill making machines may be had of Calcutta Industries Ltd, 71, Canning St., Calcutta. Glass phials may be had of Satya Charan Pal & Sons, 194, Old Chinabazar Street, Calcutta.

1867 A. V. S., Salem. For paraffin wax and stearin enquire of Mahesh Ch. Bhattacheryya & Co., 10, Bonfield's Lane, Calcutta.

1868 A. B, Nagpur City. Alkanet roots may be had of Bansidhar Dutt, 126, Khengaraputty, Calcutta. Put some animal charcoal in til oil and put in the sun for 15 days. An article on boot polish appeared in June, 1923 issue. Glass phials and corks may be had of Satya Charan Pal & Sons, 194, Old Chinabazar Street, Calcutta.

1870 A. L. H, Lota. For bleaching bamboo used for match splints please refer to September, 1923 issue. Please refer your query to Mr. A. P. Ghosh, 42, Beniapukur Rd., Entally, Calcutta.

1871 R. B. L, Roorkee. For oil presses enquire of Messrs Burn & Co., 7, Hastings Street, Calcutta.

1872 R. W. M., Hingoli. You may consult Bombay Chronicle, Bombay.

1873 M. R. J., Basti Guzan. Can supply heron's feather.

1874 R. S. M., Allahabad. The discolour of the hair dye is due to impurities of the ingredients used.

1876 M. K. M., Gaibanda. Wants expert advice on posset extracting from pure milk and preserving the same for a long time.

1877 D. K. M., Burdwan. Many mechanical tools will be necessary for starting a work shop besides a lathe and a drilling machine; for expert advice please consult a mechanical engineer. For syrups you may go through Syrup Manufacture published from Industry Office. For erecting sulphuric acid plant enquire of Simon Carves Ltd, 20, Mount Street, Manchester, England. For silver plating enquire of a silversmith of your locality. Tinplating may be done by De & Co., 158, Dharamtola Street and Ghose, Chackravertty & Co., 223, Bow Bazar Street; both of Calcutta. For analysis write to the analytical chemist to the Govt. of Bengal, Medical College Calcutta. Soda water bottles may be had of Little & Co., 3, Grant Lane, Calcutta.

1879 A. K. M. C., Kanchrapara. Pure almond oil may be used as hair oil.

1883 N. K. B., Dacca. You may utilise corn grinding machines in grinding corns of various kinds. As there is difference of price there must be difference of quality of the machine and capacity of production. Envelope making may be undertaken as a cottage industry. An article on candle making appeared in December 1922 issue. Thread ball making machines may be had of Oriental Machines Supply Agency Ltd, 20-1, Lal Bazar Street, Calcutta. For learning painting you may apply to the Principal, Government School of Art, Park Street, Calcutta.

1884 K. V. S., Chalakudi. We cannot venture opinion on the subject. For particulars write to the firm and judge whether the estimate given by the firm is workable or not.

1885 M. D. G, Jamadoba. Preparation of cattle food according to the process mentioned by you is in its ex-

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of the most popular
Monkey Brand Black
TOOTH POWDER
FOR ALL DENTAL DISEASES
Apply to—
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perimental stage. Consul-General is not a trader; *Tuk* a bye-product of ghi-making, can be prepared perfectly from separated milk. *Mawa* or *Khowa*, which consists of desiccated milk sweetened with sugar can be made from separated milk. Cream separators may be had of P. Lodge & Co., Post Box 6772, Calcutta. Formula of rose water appeared in the last issue. China grass or rhea called *Kankura* (rarely *Kund* or *Kurkund*) in Bengal is used for various industrial purposes. The fibre of china grass is used for sacking, sail cloth, belting, table cloths, sheeting, shirting, dress cloths, laces, nets, thread, string, cordage, ropes, fishing-lines and paper. There is reference also to show that in ancient times it was used for the production of the best document papers in China. It is employed at present very largely for giving strength to other textiles and has hardly assumed an independent or recognised, position. Other queries are engaging our attention.

1886 K. V., Chendragiri. Formula of hair curling lotion appeared in the last issue. An article on ink appeared in November 1922 issue. An articles on pickles appeared in June 1924 issue. Wants to learn canning by post.

1887 I. E, Patiala. Lozenge making machines may be supplied by J. H. Day Co, Cincinnati, Ohio and Nations Equipment Co., Springfield, Massachusetts; both of U. S. A.

1888 K. W., Gwalior. Packing timber may be had of Ram Chandra Tatt, 10 Ram Kristopur Ghat Road, Howrah. Formula of casein appeared in February 1922 issue. Information regarding registration enquire of Registrar Office. Other queries should not be dealt with in these pages.

1890 K. S. V. N., Ludukotah. Fomula of blue-black ink appeared in June 1923 issue.

1891 M. K. M. B., Rawalpindi. Yes, Cashmere novelties have good market in America and Europe.

1892 C. S., Lyallpur. You are referred to automobile licensing offices for the number of automobiles run in India.

1893 M. M., Cawnpore. Refer to No. 1888 above.

1894 P. B., Vartej. Neem oil may be had of Calcutta Chemical Works, Panditia Road, Ballygunge, Calcutta.

1895 M. D. T. C., Shikarpur. For ink rollers used in type writing machines enquire of Rogers & Co., 10 Waterloo Street and Remington Typewriter Co., Council House Street, both of Calcutta.

1896 G. A. S., Punalur. No books other than those already mentioned by you on match industry is known to us.

1897 M. B., Agra. Electrical goods may be had of Mc Lawrie & Co, 17 Ezra Street and B. H. Singh & Son 180 Lower Chitpur Rood; both of Calcutta. Electrical goods may be supplied by Ward & Gold Stone Ltd., Frederick Road, Pendleton, Manchester, England and The Hart & Hegeman Mfg Co., Hartford, Connecticut, U. S. A. Cut. piece-goods may be had of B. P. & A. B. Bysack, 102 Khungraputty and Tincori Dulal Chand Bysack 33 Khungraputty; both of Calcutta.

1898 C. N., Laitkynsew. You may enquire of Messrs Bansidhar Dutt & Co., 126 Khungraputty, Calcutta for spices.

Bombay Deshi Oushadhalaya.

Factory and Dispensary.

ASK FOR ANY FEVER

AGUE KILLER.

1 Phial As. 8. Doz. Rs. 5.

and our other popular remedies. Can be had everywhere at Cheapest Rate.

Pearl & Co.,

Victoria Garden, Bombay.

1899 B. C. C. B, Khurda. You may write to fish vendors of New Market directly or you may advertise in some papers of Calcutta for disposing your fish.

1900 M. J. J., Therlam. For sugar mills enquire of Messrs Burn & Co., 7 Hastings Street, Calcutta.

1901 S. R. A., Chikati. Method of manufacturing casein appeared in the February 1922 issue of INDUSTRY. You may also consult Bulletin No. 1 published by the Industries Department, Bombay regarding the manufacture of casein. The bulletin is available of the Superintendent Government. Printing, Bombay. Casein may be had of Calcutta Chemical Co., Panditia Road, Ballygunge, Calcutta.

1902 H. K. B. Narayanganj. For books on Indian preserves, you may consult Indian Chutnies and Preserves published by Messrs Thacker Spinck & Co., Esplanade, Calcutta. 'Manufacture of Syrup' published by Industry Office, Calcutta will help you in preparing rose, bael pineapple and other syrups you name. For books on culinary art write to Messrs Chakraverty Chatterjee & Co. Ltd., 15 College Square, Calcutta.

1903 R. C. B., Ahmedabad. It is difficult to give names of buyers of second-hand gunny bags, iron drums, etc. You may send circulars quoting rates to prospective purchasers of the articles you mention or advertise in the paper.

1904 A. R., Khurja. Wants the address of the agent of 'Planet Junior'. Will any of our readers help him?

1905 G. C. S, Calcutta. To learn tailoring you may go through the following books: (1) Master Tailor by Upendra Nath Das Gupta to be available of the author at 54-3, College St., Calcutta; (2) Darzi Bijnan by A K. Sen Gupta to be had at East Bengal Society, 1, Mirzapur Street, Calcutta. 'Barias' go by the name of *bari* in Bengali, which is used in winter with curries. Green gram is *matar*, horse gram is gram taken by horses, black gram is ordinary *chola*. For rates of formalin enquire of chemists, whose name appears above. Wants to be introduced to the suppliers of sal leaves.

1906 V. V. P., Calcutta. Sugar candy is made by the method of crystallisation of sugar the process of which appeared in the last issue of INDUSTRY. You may also consult December, 1920 issue of INDUSTRY.

1908 M. R. T., Lahore. To master the process of preparing fire proof bricks and clays you may go through Martin's Industrial Chemistry which has an interesting chapter on the subject.

1909 R. L. M., Lahore. Hemstitched handkerchiefs are made by many firms on a small scale, whose address it is difficult to supply. Wants to be introduced to manufacturers of hemstitched handkerchiefs.

1910 P. D., Sheikhupura. You are to calculate the profits to be derived from working thread balling machines by noting the daily output, the cost of production, labour charges, marketing charges, etc. To market your goods you are to appoint your agents in important trade centres. To learn soap making you are referred to Soap Making by A. Watt.

1911 J. R. K., Gujrat. As goldsmiths recover pure gold from alloys, you may recover gold from rolled gold by adopting the similar process. Formula of washing soap appeared in May 1924 issue. In place of tallow you may use coconut oil, groundnut oil or mohua

Cheapest House for
Sporting Goods
Silver Medals, Cups & Shields.
Fine Silver Medals in Velvet lined cases.
Rs. 3-12 Each.
Largest Stock & Variety
Illustrated Lists Free.
CARR & MAHALANOBIS,
Chowringhee Corner, Calcutta.

oil. There are two canning factories in Calcutta. Canning machineries may be supplied by The Twentieth Century Machinery Company, Milwankee, Wisconsin, U. S. A. You may refer your query to The Scientific Poultry Breeders' Association, The Beeches, Rudgwick, Sussex, England and U P. Poultry Association, Royal Hotel, Nainital, U P. Wants to know the address of Modern Poultry Farm in U. P. Formula of rubber solution appeared in March 1922 issue. Seek expert advice on preserving eggs. Formula of metal polish appeared in June, 1921 issue. Process of preparing steel trunk varnish appeared in January, 1922 issue. Hydraulic lime is *chunam* while patti lime is a kind of *lebu*. White oil is a kind of white purified mineral oil not produced in India and therefore in vernacular it is called *bilati tael*. Names of foreign technical journals will be found in the Official Handbook of The British Association of Trade and Technical Journal Ltd., Sicilian House, Southampton Row, London, W. C. 1. A science graduate wants to be an apprentice in some factories.

1912 B. U. P., Nakuru. Castner Kellner Rocking table may be supplied by Blair Campbell and McLean Ltd., Woodville Street, Goran, Glasgow.

1913 R. S. B. C., Delhi. Glass bangles are manufactured by S. Komai Glass Manufacturing Co., 4, Chome, Minami Henmachi, Higashi ku, Osaka and Nishiumi Sakujiro Shoten, 49, Shichome Minami-kyuboji-machi, Osaka ; both of Japan.

1915 N. L. D., Dacca. Money bags may be had of Calcutta Co-operative Stores Ltd., 15, College Square, Calcutta. Yes, you will have to take permission for collecting selections from various authors. You may buy a British Postal Order of the required sum and send it by post. You may read Hugo's Primers for learning French and German. You may go through Pitman's Mercantile Terms and Abbreviations.

1916 K. R. B, Bombay. For Kali Kavacha you may write to Pandit B. K Jyotirbhusan, 370A, Upper Chitpur Road, Jorasanko, Calcutta. For German goods enquire of Singh Sarkar & Co., 105, Harrison Road, Calcutta.

1918 J J. G, Dighirpar. It is not possible to manufacture paper on small scale.

1919 G P. M P, Mandla. Air guns may be had of K. B. Nun, 233, Old China Bazar Street, Calcutta. Wants to be introduced to importers of State Express Cigarettes, No 555.

1920 W. C., Gaya. Curios may be had of Messrs. Krishna Bahadur & Bhakat Bahadur Nepali, 57 and 103-2, Lower Chitpur Road and The Oriental Stores, Stall No. 119, 120 and 121, Hog Market ; both of Calcutta.

1921 N. G. & Co., Bombay. The process of making ropes from coirs was fully discussed in an article in the July, 1921 issue of INDUSTRY which you may please consult For fibre machineries you may enquire of Ernest Lehmann, 8, Chatham Bldgs, Chatham Street, Manchester : you may also enquire of Oriental Machinery Supply Agency, 20-1, Lal Bazar Street, Calcutta.

1922 P. R. N. & Co., Bombay. Creosote oils, B. P. 230°-270° C, sp. gr. 1.04 form perhaps 10 per cent of the tar. They consist of a complex mixture of neutral and acid oils, among which may be mentioned naphthalene, dinaphthylene, methyl-naphthalene, xylenol, naphthol and paraffins. Carbolic acid is phenol.

1923 V. D. C., Rangoon. For drawing papers, etc you may enquire of Nilmoney Haldar, 106, Radha Bazar St., Calcutta.

1924 S. C. D. P., Saktipur. You may consult a commercial paper, viz. Indian Importer and Exporter published from the Pioneer Office, Allahabad. For yarns communicate with East and West Trading Co., 16, Bonfield's Lane, Calcutta.

1925 J. N. B., Kharagpur. For preparing lavender water consult last

September issue wherein recipes on the same subject appeared.

1926 Roll No. 19007., Basti. The oil of thyme is used in Europe as an ingredient in culinary seasoning. Its use is not known by the Indians. Cinnamon oil is used in medicine. *Badam* oil is used as an adulterant in ghee and also for soap manufacture. Lavender oil is used to cool the brain and both lavender and sandal oils are used as perfuming agents. All the other oils mentioned by you are more or less used for medicinal purposes. Tannic acid is used for tanning. Peppermint oil is used in European medicine as an antiseptic and antineuralgic. Phials, corks and capsules may be had of Satya Charan Pal & Sons, 194, Old China Bazar Street, Calcutta. Wants to be put in touch with dealers in Surti tobacco.

1928 R. S. B., Delhi. Stationery articles are manufactured by Bengal Miscellany Ltd, 82, Colootola Street and Dass & Co., 60, Sikdar Bagan St., both of Calcutta.

1932 V. M. S., Wadhwan Camp. Formula of pain balm appeared in December 1922 issue.

1933 K. P. V., Buxar. The required address is Hindusthan Association, 116, West 39th Street, New York, U. S A.

1935 N. V. K. R., Pedapatnam. Wants to be put in touch with wholesale fruit dealers.

1938 R. D. S. S., Lucknow. Laces may be had of K. N R Subbiah Naidu & Bros. Quilon, Travancore ; Peary Lall Amirchand, Chandni Chowk, Delhi ; Ceylon Lace and Curio Manufacturing Co., Shining Way, Colpetty, Colombo, Ceylon ; H. Ahmad Hasan Allawala, 69, Khungraputty, Barabazar, Calcutta and S. R. S. Petersen & Bros, Ellore, Kistna.

1939 M. D. K. C, Amritsar. Cotton may be bought of Amritlall Lachmandas, 68, Bartolla Street and Goolabray Shewbux, 53, Cotton Street ; both of Calcutta.

1940 M. C., Bombay. Paraphenylenediamine is prepared by reducing paranitraniline with iron and hydrochloric acid. You may buy any comprehensive handbook on chemistry.

1941 B. B. L. K., Ambala City. For coloured lights refer to September, 1924 issue. For books on ornamental design enquire of Srikrishna Library, 111, Upper Chitpur Road, Calcutta. Python eggs are a kind of fireworks. Addresses you require appeared several times in these columns. German novelties may be had of Singh Sarkar & Co., 105, Harrison Road, Calcutta. Watches may be had of Roy Bros., & Co., 14, Radha Bazar, Street ; Ghosh & Sons, 16-1, Radha Bazar Street and Abrecht & Co., 17 & 18, Radha Bazar Street ; all of Calcutta. Formula of brass polish will be found in June, 1921 issue of INDUSTRY. Process of nickel plating appeared in June, 1923 issue. You may consult Export and Import Review, 38-39, Krausenstrasse, Berlin Germany, Mercantile Guardian, 16 St. Helen's Place, Bishops Gate, London, E. C. 3 and COMMERCIAL INDIA, Sham Bazar, Calcutta.

1942 P. N., Chokkadi. First buy a warping machine as a model then try to make more machines on the same design by some carpenters.

1944 P. S., Trichur. Mr. S. N. De is not an expert in silvering mirror, he is a botanist.

1945 H. S. K. C., Lahore. For starting business with small capital please go through September 1923 issue. Process of removing tattoo marks appeared in last issue. Pearl buttons may be supplied by R. Mann & Co., 1, Chome, Sannomiya-cho, Kobe and Matsuoka Seizo Shoten, 5, Sanchome, Sanjukkenbori, Kyobashi-ku, Tokyo ; both of Japan.

1946 P. S., Lahore. You may write to the Secretary, Institute of Chartered Accountants, Moorgate Place Landon E. C., and also to the Secretary, Institute of Civil Engineers, Great

George Street, Westminster, London S. W. 1.

1947 A. A. K., Kaimgang. For Norway matches enquire of Lal Chand Bros., Match Depot, 33A, Central Avenue, Calcutta. Imitation pearls may be had of The Laurel Novelty Co., 41-43, Park Street, Calcutta. Dietz laterns may be had of Elliot & Co., 6A, Clive Row, Calcutta. Wants to buy coconuts and betel nuts.

1950 A. S., Bhakkar. Wheat flour mills may be supplied by Messrs Burn & Co., 7, Hastings Street, Calcutta.

1952 T. P. B., Shillong. For machine and estimates for starting a hosiery factory please write to Economic Hosiery Mills Ltd., 55, Dharamtola Street, Calcutta.

1953 S. B. S C, Amalner. Copying press may be had of Ashutosh Addy, 16, Lower Chitpur Road, Calcutta. Pictures may be supplied by Amano & Co., 313, Nichome, Sannomiya-cho, Kobe and Iida & Co. Ltd., 81, Yamashita-cho, Yokohama; both of Japan. Custom duty charged on pictures is 30 per cent *ad valorem*.

1954 C. L. S., Berhampur. You should use pure lac free from any impurity.

1955 G. K., Khamgaon. For appearing at the B A. Examination as a private candidate write to the Registrar of Allahabad University. No special permission will be required for using the chemicals mentioned by you.

1958 M. Y. S. C., Delhi. For survey instrument enquire of Lawrence and Mayo, 16, Court House Corner, Calcutta.

MONEY MAKING.

To make money send a post card now for free particulars of our remarkably successful money making books and plans by eminent English and American economists Strongly recommended.

C. & S. DAVE BROS.,
P. O Nandol.
Nr. Ahmedabad, Prantij Ry.

1960 C. L. S., Hazaribagh. Formula of hair dye appeared in June 1924 issue.

1961 M. R., Hoshiarpur. Wants to learn the work of a goldsmith.

1961 A. D. P., Sangli. Formula of vaseline pomade will be found in the last issue.

1964 G. S. K., Hubli. For glass enquire of Fatic Lal Seal & Sons, 16, Swallow Lane and Hemchandra Chunder, 13 Swallow Lane; both of Calcutta.

1965 A. S., Agra. Please repeat your query.

1966 T. S. B., Bilaspur. For knitting machines enquire of Indo-Swiss Trading Co., 27, Pollock Street, Calcutta.

1967 K. P. V., Buxar. Nib making machines may be had of Bengal Small Industries Co., 91, Durga Ch. Mitter Street, Calcutta.

1968 K. C. D., Jamalpur. For silks enquire of Angus (Frederick William), 12 rue-du Garet, Lyon; A Gagniere & Cie, 5, rue St-Augustin, Paris; (both of France.) Das Talukdar Agency, Strand Road Gauhati, Assam, Pohoolmul Bros., 33, Canning Street, Calcutta and Metharam Navalrai, 7A, Lindsay Street, Calcutta.

1969 N. L, Hansi. Rape seed oil is not very suitable for hair oil. You may however consult Hair Oil Manufacture published from Industry Office.

1970 D. S., Negapatam. Desires to buy spermaceti.

1772B. S. P., Sringeri. Kumkum is a natural product hence its formula is not available. It is not possible to turn the worst ghee into best ghee.

1974 J. L. S., Aligarh. Bidi-leaves and tobacco may be had of Moolji Sicka & Co., 51, Ezra Street, Calcutta and Chunilal Purushottamdas, 128, Lower Chitpur Road, Calcutta. Betelnuts and catechu may be bought of Bansidhar Dutt, 126, Khengraputty, Calcutta.

1975 H. J. H. O. S., Trivandrum. You may write to Consul General for Germany, 2, Store Road, Ballygunge, Calcutta and Consul-General for Japan 7, Loudon Street, Calcutta. Tin boxes are supplied by Higashidani & Co., 17, Itchome, Kitahorie, Kamidori, Nishiku, Osaka ; Kiyosu Shoten, Tsukishima, Kyobashi-ku, Tokyo (both of Japan) ; Deutsches Blechwarenwerk, A-G , Braunschweigh, Germany and Gajanand Rampertap & Co., 6, Halsi Bagan Road, Calcutta.

1976 K. E. I. A., Srinagar. Gold and silver threads may be bought of Messrs Amitava Ghosh, 33, Canning Street, Calcutta. Irons may be bought of Pioneer Mail Supply Co., 93-3, Clive Street, Calcutta.

1977 D. C., Lyallpur. Please refer to No. 1975.

1978 I. D. P., Surat. For weaving machines and accessories enquire of Messrs Bros. Partner, 35, Ezra Street and B. D. Bery & Co., 43, Ripon Street ; both of Calcutta.

1980 B. R. S. D. C., Pindi. An article on cigar and cigarette manufacture appeared in September, 1920 issue.

1981 S. K. S. N , Satur. Coaltar distilling apparatus may be supplied by Simon Carves Ltd., 20, Mount Street, Manchester and Blair Campbell and McLean Ltd., Woodville Street, Goran, Glasgow.

1982 S. L., Sambhar Lake. For work for leisure hour you may go through New Idea Columns of INDUSTRY.

Soap and Perfume Manufacturers.

FREE samples of perfumes for above trade will be sent on receipt of the inquiries from bonafide manufacturers. Excellent qualities of the highest strength. Prices lowest.

Write for Samples to-day—

Anglo-Indian Drug & Chemical Co.,

No. 155, Juma Musjid Circle.

P. O. Box 2082, Bombay.

You may utilise the ribbons in preparing ink by boiling them in water. An energetic young man having experience in various office works wants a lucrative post in some foreign country. Will some readers of INDUSTRY help him to secure the job ?

1984 G. S. N., Masulipatam. All the addresses you require appear elsewhere in this issue.

1988 D B , Ahmedabad You may consult Dharwarvritt, Dharwar ; Dryan Prakash, Budhwar Peth, Poona City ; Dainik Basumati, 166, Bow Bazar Street, Calcutta; Hindi Kesari, Benares and Agra Akhbar, Mohalla Nai Basti, Agra.

1989 B. U. Q , Agra. Write to the advertiser with number umber care of INDUSTRY.

1991 M. L. S., Jaipur City. You are referred to the formula of preparing guts which appeared in June, 1922 issue.

1992 T. S. M., Cocanada. Peacock's feather may be bought of The Indian Trading Co , Jaipur and Sri Ram Kamath & Co , 1. McLean Street, George Town, Madras.

1993 R. B, Lahore. A young man who has passed the Entrance Examination of the Punjab University wants to be an apprentice in some electrical workshop.

1995 B. S., Patna. Can supply waste paper and broken glasses.

1906 B. P. D. M , Calcutta. You may sell mercury to any chemist. You may have your deer skin cured by Calcutta Research Tannery, Canal South Road, Pagladanga, Calcutta. To sell auto-knitter advertise in some news papers.

1997 P. S., Dacca. Sugar making machine may be supplied by Messrs Burn & Co., 7, Hastings Street, Calcutta.

1998 V M W , Kolhapur City. Consult a physician.

1999 S. A. R., Secunderabad. Wants to be put in touch with importers of old woollen coats.

2000. S. A. R, Secunderabad. Formula of washing soap appeared in May 1924 issue.

2002 R. K. C., Bombay. Unless you let us know your vernacular it is very difficult on our part to give the vernacular equivalens of herbs mentioned by you. Wants to be put in touch with dealers in medicinal and industrial herbs.

2004 R. C. L, Mettupalaiyam. Dairy appliances may be had of Jupiter Trading Agency, Mulji Jetha Market, Karachi. Tinned foreign butter is presenrved butter while local butter is fresh butter. For particulars regarding dairy farm write to Mr. P. C. Sarkar C/o Bengal Dairies Ltd., 172, Bow Bazar Street, Calcutta.

2009 H. N. P., Bombay. Add some gum arabic to the powder then make tablets.

2011 N. S. N. S., Amritsar. For industrial books enquire of Book Co. Ltd., 4-4A, College Square, Calcutta.

2012 K. L. D., Calcutta. A series of article on cement manufacture appeared in the 10th volume of Industry.

2014 S. V. R., Kankipadu. White crayons are manufactured by Nandan Trading Co, Phulati Bazar, Agra. Novelties may be had of K. Alimchand & Co., Post Box No. 1015, Bombay and The Laurel Novelty Co., Park Street, Calcutta. For starting business with small capital please go through New Idea Columns of Industry.

2015 K. R. R, Madras. In sweetmeats use edible colours. Wants moulds for manufacturing Pondicherry dolls.

2017 W. H. J, Colombo. Wants to buy petrol air gas machines in India; you may enquire of Messrs Burn & Co., 7, Hastings Street, Calcutta. Glass phials may be had of Satya Charan Paul, 194, Old China Bazar Street, and Calcutta Glass and Silicate Works Ltd, 101, Cornwallis Street; both of Calcutta.

2019 D. C, Bombay. You may go through The Chemistry and Technology of Paints by Max Toch and Enamelling of Iron and Steel by J. Grunweld and Hodgson. For the books try Messrs Chakraverty & Chatterjee Ltd., 15, College Square; Book Co. Ltd, 4-4 A, College Square and Thacker Spink & Co., Esplanade; all of Calcutta.

2020 L. H. S., Samta. Kelly's World Directory will serve your purpose. You need not buy directories of separate countries For Kelly's Directory enquire of Kelly's Directories Ltd., 182-181, High Holborn, London, W. C.

2023 S. K. A, Nagpur. There is no important newspaper or journal in Kashmir. For mango grafts enquire of Nurjehan Nursery, 2, Kankurgachi 1st Lane, Calcutta. You may invest Rs. 250 to Rs. 1000 in toy manufacturing according to the nature and quality of toys manufactured.

2025 V. N., Secunder. For corks of the required design enquire of Messrs Dhar Bros., 82, Harrison Road, Calcutta. Colours may be had of Aminchand Mehra & Sons, 34, Armenian Street, Calcutta. For label printing enquire of the Imperial Litho & Tin Printing Works, 1-2, Mechua Bazar Street, Calcutta.

2029 V. J. S., Jodiya. For leisure time work you may go through New Idea Columns of Industry. Wishes to be put in touch with dealers in cigar tobacco and cigar paper.

2032 K. C, Quetta. For crown corks enquire of N. W. Mitchell & Sons Ltd, 2, Dod Street, Liene House, London, E. 14. For coloured printed tins vide No. 1975. Boot polish requisite may be had of J. M. Chakravertty, Bysack Factory, 3, Brojo Dulal Street, Calcutta.

2034 V. M. R., Ramnad. Wants to know English, Tamil and Sanskrit equivalents of Sorangi

2035 R. L. G., Gujrat. You may consult Chamber of Commerce Journal, Yokohama, 5, Honche Itchome, Yokohama, Japan.

NOTICES & REVIEWS.

Kajoain.

This is a collyrium prepared from indigenous herbs and drugs beneficial to eyes. It may be had of Saraswati Bhandar, Meerut City.

Sanitary & Scientific Exhibition.

The All-India Maternity, Child Welfare, Sanitary, Scientific and Indigenous Drugs Exhibition of the All-India Medical Licentiates Association will be held at Agra in December 1924. For particulars, please write to Dr Shyama Shanker Shukla, Secretary, Exhibition Committee, Bailanganj, Agra and for Indigenous Drugs, write to Dr. Kunj Behari Lal Verma, Editor, Indian Medical Journal, Meerut.

Quinine Tablets.

It would appear from the analytical report of the Director of Public Health Laboratory, Bengal that the quinine tablets of the Colonial Quinine Co., are of good quality and fairly correct in quinine content while according to the certificate of the Industrial Chemist to the Government of Bengal they satisfy the standard of British Pharmacopoeia. The sole distributor for these C. Q. C. brand tablets is Basak Factory, 3 Brojodulal Street, Calcutta.

Serve YOUR **Customers**
BY PLACING BEFORE THEM MOTIWALA'S VEGETABLE.
PILE Specific (Re. 1-4)
Ointment (Re. 1)
Conserve (Re. 1) Tonic of Life
Laxative for stopping hœmorrhages (Rs. 3-8)
Postage & Packing extra Thousands of unsolicited Testimonials.
Representatives Wanted.
If your company is allied with the drug store, ours will give a worth while money-making opportunity.
D. B. MOTIWALA & SON.
Morland Road, Byculla, Bombay.

Khaddar Mela.

As is to be expected hand-made textiles loomed large in the Khaddar Mela and Exhibition of Indigenous Industries held in Calcutta towards the end of September. There were dhooties, saries, chaddars, coatings and shirtings, etc both of pure and half *Khadi*. It is extremely gratifying to note that the quality of khaddar has of late improved considerably while the prices have gone down. The grounds are of fine solid texture while the borders are attractive. The following firms vied with each other in exhibiting to best advantage (1) Khaddar Prachar Samity, 11-3 Harrison Road, Sealdah, Calcutta. (2) Chittaranjan Swadeshi Bhandar, 77, Raja Raj Ballav Street, Bagbazar, Calcutta (Calico printed laces 3 as per yd.) (3) Ranuka Bhandar, 20-1 Cornwallis St., Calcutta. (4) Bharat Khaddar Bhandar, 4, College Square, Calcutta. (5) Nava Jivan Bhandar, 166, Harrison Road, Calcutta. (6) Hem Prova Bhandar, 21, Cornwallis St., Calcutta (nice wrappers like shawls). (7) Basanti Bhandar, 213, Cornwallis Street, Calcutta. (8) Bharat Bhandhab Bastralay, 130, Cornwallis Street, Calcutta. (9) Desha Bandhu Bastralay, 21, Cornwallis Street, Calcutta. Representatives of different districts of Bengal were (1) Chittaranjan Bastralay of Comilla. (2) Prabartak Emporium 29, Cornwallis Street, Calcutta. (3) Noakhali Khaddar Stores, 22, Cornwallis Street, Calcutta. (4) Chittaranjan Khaddar Bhandar, 10-1, Cornwallis Street, Calcutta. Branch of Chittaranjan Loom Factory of Dacca. (5) Chattala Agency, College St, Market, Calcutta, (automatic charka). Frocks, pennies, jackets, etc were shown by Faridpur Bhandar, 130-7, Bow Bazar Street, Calcutta. Two specialities met the eyes everywhere : (1) Products of the Bose's Calico Printing and Dyeing Works, 21, Station Road, Ballygunj, Calcutta comprising clothings dyed in beautiful fast shades and printed in attractive floral designs. (2) Narrow and broad borders of the dhoties, saries and chaddar executed in lustrous muga silk which adds to the charm of the cloths.

Silk textiles of all sorts were exhibited by Messrs. H. Barratt & Co., Post Box 7877, Calcutta and by Messrs Ray Company, 213, Bow Bazar Street, Calcutta. Dacca textiles were shown along with other home industry products of Dacca by the Dacca Industries Home, 57-1, College Street, Calcutta.

Horn articles of every description are made by the Calcutta Horn Manufacturing Co., Post Box 8901, Calcutta. Messrs. S. N. Basu & Co., 91, Raja Dinendra Narayan Street, Calcutta, are manufacturing durable trunks from compressed fibre.

The products of the Hamlet Strop and Paste Mfg. Co., 25, Jagannath Sur Lane, P. O. Beadon Street, Calcutta are serviceable. The Unique slates prepared by Messrs. Balkrishna Mohta & Co., 41, Khettra Mittra Lane, Salkia, Howrah, have become popular. U. N. Guha's Swadeshi matches may be had of the International Trading Syndicate, 44, Mechua Bazar Street, Calcutta.

The Snake-bite cure of The Great Bengal Pharmacy, Mihijam, E. I. Ry or 46-1, Durga Ch. Mitter St , Calcutta has created a mild sensation.

Samples of the finest yarns spun by Sm. Aparna Devi a daughter of Mr. C. R. Das deserve prominent mention. She is the recipient of the first prize. in all-India spinning competition.

Handlooms were demonstrated by Vidya Sagar Bayan Vidyalaya, 18, Tamer Lane, Calcutta. The most unique exhibit in the whole fair were a couple of Thumb nail drawing on celluloid by Mr. Uttam Kumar Mitter, 42-1, Harry Ghose Street, Calcutta. His Temptation (Rs. 25) is exquisite and The Wave artistic.

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Secretary work courses. Tuition free by post.
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Rajuri, Dt. Poona.

Trade Enquiries.

[Letters to the parties are to be addressed by number and initials under care of INDUSTRY when these will be duy redirected]

1029 A. S. S, Cuttack Wants to introduce Cuttack-made sarees and gamachas to the Oriya people of Rangoon, Mandalay and Singapore.

1959 D. G. P, Nasik. Wants to know how many soap manufacturers make use of chipping, milling and plodding machines.

1985 K. S. F. R, Ranchi. Can lease off a lead mine.

1986 F. B, Secunderabad. Can supply buffalo horns.

2027 R. C., Bangalore. Can supply acacia catechu.

2028 C. R. H., Hyderabad. Wants to be introduced to dealers in oil cakes.

2081 B. S., Pondicherry. Wants a capitalist to start a profitable business.

2085 A. V. F., Nora Goa. Desires to go to U. S. A. for prosecuting studies in engineering. Can any one help him ?

2089 F. B., Secunderabad. Can supply crane's feather.

2130 R. M. C, Krishnagar. An well established firm wants a capitalist to invest to a profitable concern.

2153 J. N. S. C., Karachi. Wants a capitalist to invest Rs. 25,000 to a running soap manufacturing concern.

2169 V. K. A. R., Bhandup. Can supply a Japanese match manufacturing machine.

2178 M. N. D., Calcutta. Wants a capitalist to invest Rs. 50,000 to Rs. 80,000 to some profitable concern.

2185 D., Bijawar. Can supply hematite iron ores.

2218 S. P. Y., Ahmedabad. Desires to be put in touch with dealers in peacock's feather.

2222. C. L. T., Pilibhit. Is ready to receive circulars, prospectus, catalogues to be placed on the table of a library free of charge.

2252 K. C. C., Nagaram. Desires to be put in touch with dealers in stationery, aerated water machines and fountain pens at Calcutta, Bombay and Madras,

2276 B. L. J. C, Sikandra Rao. Wants to be introduced to dealers in betts, bed straps, note purse, side bags, etc.

2297 N. A, Calcutta. Wants to be put in touch with suppliers of Madrasi lungis.

Notice.

Those letters answers to which could not be prepared in time for this issue will be treated in our next.

November Issue of Industry.

(*In the Press.*)

The November issue of INDUSTRY which will appear on the last day of the month will contain articles on Wool Dyeing, Poultry Raising, Button Making, etc in addition to the regular features such as Formulas, Small Trades, Queries and Answers, etc. Any friend of our subscribers may get a copy free as sample on application to the Manager,. Industry, Shambazar, Calcutta.

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Is a monthly Journal of Technology and Handicrafts, Science and Commerce, Agriculture and Business The rate of subscription is as follows:—

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Single Copy As. 5 only.

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Industry is published at the end of every month

Subscribers are enlished at any time of the year but they will receivr only the number from April to March comprising a complete volume for one year's subscription.

At the time of sending a V.P.P. only the current number is generally sent. The previous issues of the volume are sent per book-post on receipt of the value of the V.P.P. For particulars and Advt. rate please write to—

Maneger, INDUSTRY OFFICE,
Shambazar, Calcutta,

Managing Editor—Mr K. M. Banerjee,

INDUSTRY
A Journal of Technology Handicrafts & Commerce.

Vol. XV. CALCUTTA, NOVEMBER, 1924. No. 176

Indian Artwares in Internation Commerce.

IT HAS been admitted on all hands that the Indian Pavilion in the British Empire Exhibition was the most successful from every consideration and the reason is to be sought for in the intrinsic worth of the Indian artwares displayed therein. The Punjab and the United Provinces Courts specially were fortunate in making cash sales of these products as well as in booking future orders for them. All these augur well for us—only if we would take advantage of the situation. In order to find a permanent foreign market for Indian artwares we have perforce to organise our resources on a large scale.

First of all museums must be opened in every provincial capital to house typical samples of local produce and a central museum either at Delhi or at Calcutta with a representative collection of all-India artwares. A dozen such emporiums will ensure the adequacy of the supply of Indian artwares and will be of immense practical help to those who wish to trade in them.

Internally, agencies must be started in this country with wide ramification to collect the country-made artwares from the industrial centres and even remote villages. The need for standardisation must not be overlooked in this connection. The uniform standards as to size, shape, colour, finish, etc , must be strictly adhered to. Of course the patterns would change with fashion and adaptations be made to suit divergent tastes. But in every novel departure care must be taken not to sacrifice distinctive traits to expediency. The question of cataloguing these products comes next. They should not only be judiciously classified but should also be assorted according to quality and price. The catalogues should be as comprehensive as possible with illustrations and description of the products offered for sale. Much depends, in these days and in foreign countries, on well got up trade literature which may be both attractive and educative so as to draw interest in Indian artwares.

Externally, there are certain alternatives. Stores of Indian artwares may be opened in foreign capitals by Indians themselves. Or Indian firms dealing in these artwares in this country may delegate their agencies to foreign companies. This latter course would be more expeditious though the former would be more desirable. The best course would be to assist materially the foreign firms in creating a demand for and in the disposal of Indian goods in their respective countries for they will more readily win the confidence of their countrymen.

We shall be amply justified in launching upon such a thorough scheme for the sale of Indian artwares. The plea of cheap imitation and foreign competition need not deter us for the simple reason that machine made goods can never attain the artistic merits of hand made articles. Particularly, the Indian artwares with a hoary tradition and culture behind them and imbued often with quaint mysticism and sometimes with religious sentiment will always appeal to aesthetic tastes and capture romantic imagination. The shawls of Kashmir, the brasswares of Moradabad, the silk brocades of Benares, the ivory work of Murshidabad, the muslin of Dacca, the calico of Masulipatam, the wood carving of Mysore, the lacquerware of Burma—all these and others will hold their own against any odds. From early times they have found their way to every corner of the globe and have been received with as equal satisfaction by the fastidious millionaires in the Land of Dollars to-day as by the august Caesars in the heyday of glory of the Roman Empire. But if there have been intermedi ate lapses of foreign patronage it is solely because of our fault for we have neglected our own industries and have ourselves relegated the swadeshi goods to an inferior position.

The prospects of Indian artwares obtaining a wide sales market in foreign countries are not at all incapable of realisation. Earnest endeavours must be made to build up a steady market for them in the cosmopolitan cities like London, New York, Paris, Berlin, etc. Honest efforts must be made to create a demand for them in the hearts of the people of Europe and America.

Such a central organisation, if soundly co-ordinated will open up immense possibilities. The indigenous industries which have died out will be revived : those which are in a moribund state will be rejuvenated. The economic condition of the cottage workers will be considerably improved. The villages will be blessed with peace and prosperity. Many enterprising youngmen will have a number of occupation thrown open to them. In short this will create a channel for the influx of foreign money into India thereby increasing our national wealth. But even apart from these considerations we must strive to achieve ultimate recognition for Indian artwares as valuable commodities of international commerce.

INDIA'S INDUSTRIAL PROGRESS.

Tar Distillation in Mysore.

Government of Mysore have sanctioned the establishment of a tar distillation plant and machinery for refining methyl alcohol. The machinery has been ordered from America and the plants are expected to be in operation well before the close of the current official year. It has been decided to develop the foundry at an estimated cost of Rs. 3 lakhs to manufacture castings, more particularly, cast iron pipes for which there is a market in South India. A scheme for foundry development has been prepared and is at present under expert scrutiny. A scheme has been prepared for the entertainment and training of engineering and science graduates from Mysore, as apprentices in the different sections of the works.

Lace Industry in Madras.

As a result of the encouragement received at the British Empire Exhibitien to the South Indian lace and embroidery work, the Minister for Development to the Government of Madras is endeavouring to expand and improve the lace industry in the Madras Presidency with special reference to its possibilities as a cottage industry, and to this end the Department now proposes to have a survey of the industry carried out by an expert. The department also intends to collect information as to the patterns of lace and embroidery work most suitable for the English market. Government also propose to supply to the women workers in the presidency the required kind of material for lace making and embroidery, recouping the money thus spent from the proceeds of the sale of manufactured articles.

Food Supply and Irrigation.

The average annual production of the food supply of all-India amounts to practically 81,000,000 tons, including 33,000,000 tons of rice, 10,000,000 of wheat, 16,000,000 of other cereals, and 3,000,000 of sugar. The actual requirements of the population of 319,000,000 are 79,000,000 tons, leaving only a narrow margin of 2,000,000 tons in years of crop shortage when the monsoon fails.

The latest reports give the irrigated area in British India as slightly over 50,000,000 acres, or 13.7 per cent of the entire area cropped. Of this amount, approximately 23,000,000 acres are irrigated by canals, 7,000,000 by tanks, 13,000,000 by wells, and the remainder by other sources. A considerable part of the well-irrigated area, however, is reported as inadequately served. Irrigation projects dependent upon large rivers have brought approximately 9,000,000 acres under cultivation during the last 20 years and well irrigation 2,000,000 in the last decade. Canal projects under way will increase this area by 10,000,000 acres in a few years.

Tobacco Products.

IT IS customary for those who habitually chew betel in this country to occasionally indulge in tobacco quids along with the other ingredients which go to make it. From the lowly *sukha* and *dokta* partaken of by poor folk to the lovely *surti* and *zarda* preferred by the rich there is a wide range of products. Surti and zarda when chewed impart aroma and help salivation in the mouth. They are much in vogue in the United Provinces: Lucknow and Benares, being famous for products of superior quality.

In making tobacco quids (and snuff) good developed tabacco leaves are selected ; the stalk and the ribs are rejected ; made crisp in the sun ; pounded into powder and then sifted through a fine sieve. This light powder has been referred to as tobacco dust. The astringency of the tobacco is mitigated by soaking it in water. The measure of the perfume water employed for this purpose has been omitted. A quantity sufficient to moisten the tobacco will be required. The spices, often baked, are separately powdered and sifted. The seeds of cardamom are to be taken only. The consistency of the kneaded dough must be such as to allow of pellets being made. Where pilules are made they may be of the size of black pepper and when granules are made they may be like small sugar grains.

The pilules are coated with gold and silver leaves by simply rolling the former over the latter spread on a slab, as the leaves being extremely delicate and brittle will break up into fine particles and attach themselves to the pellets. Similar is the case with granules. The leaves must be real gold and silver and not of bronze and zinc as the products being edible must not be injurious to health.

Snuffs are of different kinds : medium, strong and mild ; scented and medicated, etc : used according to individual fancy and choice while snuffs are generally used as antidote against cold, the medicated ones are particularly used for curing headache.

Here are a few typical recipes for preparing well-known varieties of tobacco quids and snuffs.

SURTI.

(1)

Take some dust of pulopata tobacco and macerate the same with a quantity of rose water. Make the mass into pilules and coat them with silver leaves.

(2)

Hingli tobacco dust	1 sr.
Rose water	q. s.
Nutmeg	1 tola.
Musk	1 an.

Macerate the tobacco and nutmeg in a mortar with rose water. Next bruise the musk to a paste with a little rose water in a stone mortar. Add the musk to the tobacco and make the mass into pilules. Coat with silver leaves.

(3)

Motihari leaves	4 ch.
Keora water	q. s.
Nutmeg	1 tola
Cardamom major	1 ,,
,, minor	1 ,,
Musk	1 an.

Reject the stalks of the leaves and soak them in the water for 24 hours. Then throw out the water and take away the leaves. Powder the spices. Next macerate all the ingredients together in keora water. Make the mass into pilules and coat with gold leaves.

(4)

Hingli leaves	4 ch.
Coriander seed	4 ,,
Cumin seed (black)	1 ,,
Anise	1 ,,
Keora water	q. s.

Reject the stalk and ribs of the tobacco leaves. Bake the leaves and the spices separately on a moderate oven. Pound each into fine powder. Macerate the powders together with keora water and make into pilules. Coat some with gold leaves : some with silver leaves and leave the remainder without any coating. This will ensure a variegated effect.

(5)

Hingli dust	4 ch.
Cardamom major	1 ,,
Chua or Sandal paste	½ tola
Musk	1 an.
Keora water	q. s.

Knead the first three ingredients with keora water : then add the musk macerated with keora water. Make the mass into pellets and coat with gold leaves.

(6)

Hingli dust	4 ch.
Cardamom minor	1 tola
Saffron	2 as.
Musk	1 an.
Rose water	q. s.

Knead the first three ingredients with rose water : then add the musk macerated with rose water. Make the mass into pellets and coat with silver leaves.

ZARDA.

(1)

Hingli leaves	4 ch.
Rose water	1 sr.

Reject the stalk and ribs of the tobacco leaves. Next boil the leaves in good rose water in an earthen ware vessel over a slack fire. Remove when only 4 ch. is left and strain through a cloth. Dry the viscous liquid in a porcelain dish in the sun to form a cake. Then break the cake into granules and mix with fine particles of silver leaves.

(2)

Hingli dust	4 ch.
Rose water	q. s.
Musk	1 an.

Sift the tobacco dust through a piece of cloth and bray with rose water. Spread the paste over a porcelain dish and dry in the sun. Then macerate the mass with musk and dry again. Break the cake into globules or small grains and mix with gold leaves.

(3)

Hingli dust	1 ch.
Coriander seed	1 ,,
Cumin seed (black)	1 ,,
Anise	1 ,,
Musk	1 tola
Rose water	q. s.

The tobacco is first baked and then powdered finely. The spices are also backed and powdered separately. Macerate these ingredients in rose water and add the musk made into a paste with same. Mix thoroughly, strain the mass through a clean cloth and spread over a porcelain dish. Dry in the sun to form a cake. Break the cake into granules and dust with silver leaves.

(4)

Motihari leaves	4 ch.
Rose water	q. s.
Musk	1 an.

Reject the stalks and ribs of the tobacco leaves: and steep them in water in a porcelain bowl for 24 hours. Then throw away the water, take out the leaves and allow them to drip. Now add the musk and bray the two together in rose water to a paste. Spread the pasty mass over a porcelain dish and allow to dry and form a cake. Break the cake into granules and mix with gold leaves.

(5)

Hingli dust	4 ch.
Rose petals	4 ,,
Musk	1 an.
Rose water	q. s.

Bray the tobacco dust together with fresh petals to form a paste. Then incorporate into it the musk macerated in rose water. Next knead the mass with rose water and strain through a cloth. Dry the pulp to form a cake. Break the cake into granules and mix with gold leaves.

DOKTA.

(1)

Motihari leaves	4 ch.
Cardamom major	1 tola
,, minor	1 ,,
Saffron	1 ,,
Cloves	1 tola.
Rose water	8 sr.

Reject the stalks and ribs of the tobacco leaves. Then steep them together with spices in rose water for three days. Next grind them together to pulpy mass. Allow it to dry up in the sun and form a cake. Finally break the cake into quids.

(2)

Hingli dust	1 ch.
Coriander seed	2 ,,
Cumin seed (black)	½ ,,
Anise	½ ,,
Cardamom minor	1 tola
Chua or Sandal paste	1 ,,

The tobacco leaves are first baked and then powdered. The spices are also baked and powdered separately. Incorporate the scents into the powder and pack in tin pots.

(3)

Hingli dust	4 ch.
Cardamom minor	1 tola
,, major	1 ,,
Nutmeg	½ ,,
Saffron	½ ,,
Cloves	½ ,,
Cinnamon	½ ,,
Rose water	q. s.

Powder the spices and mix with the tobacco dust. Bray the mass to a paste with rose water. Dry in the sun on a stoneware plate. Break the cake into small grains.

(4)

Hingli dust	1 ch.
Coriander seed	1 ,,
Anise	1 ,,

Cardamom major	2 tola
,, minor	1 ,,
Dried rose	2 ch.
Musk	1 an.
Rose water	q. s.

The tobacco dust must be fine ; and the dried rose powdered. The spices are baked and powdered. Soak all the ingredients in rose water and dry the mass. Then add the musk macerated in rose water and bottle.

SNUFF.

(1)

Pulopata dust	4 ch.
Rose water	q. s.

Macerate the tobacco dust with rose water with mortar and pestle. Spread the mass in a stone dish and dry in the sun. Repeat, the process for seven times. Finally put in a clean phial and cork air-tight.

(2)

Hingli dust	1 sr.
Keora water	6 ch.

The tobacco dust must be extremely fine. Macerate it with good keora water in a mortar. Dry the mass in the sun and bottle.

(3)

Hingli dust	1 sr.
Rose water	6 ch.
Otto Jasmine	1 tola

Macerate the tobacco dust with rose water in a mortar and dry the mass in the sun. Then incorporate the otto thoroughly into it and bottle.

(4)

Hingli dust	4 ch.
Keora water	2 ch.
Keora atar	½ tola

Macerate the tobacco dust with keora water in a mortar and dry in the sun. Then incorporate the atar thoroughly into it and bottle.

(5)

Hingli dust	1 sr.
Rose water	4 ch.
Otto of Bella	4 as.
,, Chameli	4 ,,
,, Rose	4 ,,

Macerate the tobacco dust with rose water in mortar : and dry the mass in the sun. Repeat the process for three times. Then incorporate the scents and finally bottle. This will yield a product of superior quality.

(6)

STRONG.

Motihari dust	4 ch.
Rose otto	½ tola

Simply mix the otto thoroughly with the tobacco dust and put into glass phials.

(7)

ORDINARY.

Hingli dust	1 sr.
Lavender water	1 oz.

Macerate the tobacco dust with lavender water ; dry and bottle.

(8)

ORDINARY.

Hingli dust	1 sr.
Oil Bergamot	1 dr.
Oil Sandal	1 dr.
Menthol	10 gr.

Simply incorporate the scents in the tobacco dust and put into phials.

(9)

FOR HEADACHE.

Hingli dust	1 sr.
Rose Water	q. s.
Katchhal	½ ch.

Moisten the tobacco dust with rose water and dry in the sun. Pound katchhal into fine powder and mix with the above. Bottle.

(10)

(SAME)

Hingli dust	1 sr.
Rose Water	q. s.
Hanchuti leaves	½ ch.

Proceed exactly as above.

(N. B.—Katchhal and Hanchuti are vegetable herbs which are efficacious

(N. B.—Katchhal and Hanchuti are vegetable herbs which are efficacious against headache and may be had of ayurvedic dispensaries).

(11)

Hingli dust	8	ch.
Otto of Khus Khus	1	tola
Otto ot Rose	4	as.

The tobacco dust must be extremely fine. Incorporate the ottos into it thoroughly and bottle the mass

(12)

Hingli dust	1	sr.
Rose Water	q.	s.
Otto of Orange Flower.	q.	s.

Moisten the tobacco dust thoroughly with rose water and set in the sun for a day. Incorporate the scent ; powder : and put into phials.

GLOSSARY.

Pulopata ; *Hingli* ; *Motihari*,—are well-known trade varieties of tobacco. When mild quids and snuffs are to be prepared Hingli and Pulopata tobacco are respectively employed : while in the preparation of strong articles Motihari is used.

Chua—is a dark viscous liquid derived from vegetable sources in Orissa much used in perfumery : either for anointing the body or for imparting aroma to the mouth. Where it is not available sandal wood ground to a paste with water may be used instead.

Katchhal and *Hanchuti*—are indigenous herbs to be procured from Ayurvedic dispensaries.

Anise—mauri
Cardamom—elaich
Cinnamon—dalchini
Cloves—labang
Coriander seed—dhania
Cumin seed—jeera
Keora—pandanus
Leaves—tabak
Musk—mriganavi
Nutmeg—jaitri
Saffron—jafran
Sandal—chandan
16 annas = 1 tola.
5 tolas = 1 chhittak.
16 chhittaks = 1 seer.

q. s.—which will suffice or as required.

Poultry Raising.

POULTRY-raising is a paying industry and may be taken up either as a side line to any other food production industry or by itself. The opportunity in this country is great while the market for good poultry is wide, for the use of eggs and meat as foodstuff is increasing both amongst Europeans and Indians and the same remark applies in the demand for them in hospitals and sanitoriums. Generally speaking, the term poultry applies collectively to those species of domestic birds which are kept for the purpose of furnishing eggs and meat for human consumption. Pigeons, peafowls, swans, etc may be considered as poultry though they are bred for ornamental purposes simply while game birds may not be classified as poultry though they are used on the table, for they are wild. Poultry falls technically into three divisions : (a) comb bearers such as fowls, turkeys. etc. (b) Swimmers such as ducks, geese, etc. (c) Doves, pigeons, etc. It is hardly necessary to point out that chickens comprise the bulk of the poultry industry and therefore we shall confine our attention to them only in this article.

Commercial poultry is usually brought under four groups :

(1) Egg breeds : birds which lay large quantities of eggs but do not furnish good meat.

(2) Meat breed : birds which furnish good meat but does not lay large quantities of eggs.

(3) Double breed : do tolerably well both for the table and as egg layer.

(4) Ornamental breed. Fowls can be kept almost anywhere but they thrive in congenial places. Climate and soil conditions and the arrangement and construction of poultry houses must be as ideal as possible. The most suitable soil is that which is sandy, gravelly and abounding in *kunkar*, with a proportion of lime or chalk in it. The soil must be light enough to provide good natural drainage yet heavy enough to grow grass. The site must be protected from sharp cold winds and sheltered from rain. Ample shade must be provided for against midday and summer sun. The shade may be afforded by plants and shrubs.

To ensure health and growth of fowls as much space must be allowed as possible. In the construction of a poultry house the freedom and comfort of the fowls are the most important factors. There must be a sheltered verandah attached to the house. To it must be adjacent a spacious yard to serve as runs. The poultry house must be fairly roomy, well ventilated, open to sun light and dry and sanitary at all times. It may be built either of brick, wood or mud walls. Tiled roof may serve but not metallic. As to the interior of a poultry house there must be adequate arrangement for nests, perches, etc. The perches should run parallel to the walls, inside of course, and must be 1 to 1½ ft. high. They may be of wood. Earthenware bowls (known as *gumlas*) will serve as laying nests. These should contain dry ash, sand or sifted earth. Besides there must be water vessels, dust bath and a lime manger. The yard must be amply protected against animals and thieves and the house itself against rats, snakes, etc. Cleanliness in everything is essential. Provision should be made for ample water supply.

The feeding operations on a poultry farm constitute the largest part of routine work. Feeding must be carried out promptly, properly and economically. Great care must be observed and pains undertaken in feeding the poultry.

Great intelligence is necessary to determine the most suitable feed for poultry. They must not only be palatable, digestible and nourishing but must contain all the elements of a well-proportioned diet. Above all it must be economical, that is, must render the greatest benefit at the least cost but the quality should never be sacrificed to price.

The constituents of a nourishing food are water, protein, carbo-hydrates, fats and ash. All available foodstuff containing these nutrients fall under (1) grains, (2) meals or prepared foods, (3) green foods, (4) mineral foods.

What is the best food grain for poultry? It may be given either whole or coarsely ground together with the bran. Barley is given mixed with wheat or whey. Next come oats, beans, peas, grain, etc. which are bruised and softened in water. Maize may be given for fattening fowls.

Wheat constitutes by itself a well-balanced ration. It is a better growing feed than fattening feed. Hulled oats or oat meal is an excellent food for growing chicks. Barley ranks between oats and corn as a growing and fattening feed. Rice is not considered as a valuable diet. Rye, peas, sorjhum seeds may also be administered.

An exclusive grain diet is however improperly balanced. Sometimes oil cakes are therefore mixed with the grain such as cotton seed or linseed meals. Even minced meat, chopped vegetables, fish scrap have been given to poultry with profit. Even skim milk or butter milk will be found remarkable for poultry feed if they be obtained cheap. Indeed fowls use some animal food and green food.

There must be judicious changes of diet at the different seasons of the year. The daily courses must also be rationed judiciously.

Mineral matter should be supplied to poultry in two forms : that which is quickly available as such, and in a hard form, not so easily assimilable. The former is drawn from mashed meal but the latter is supplied by grit and oyster shells. Mineral matter is required for the up-building of bone and in the formation of egg shells.

Generally fatty fowls stop layings. Therefore less fat forming food must be allowed to those birds from which large quantities of eggs are expected. For table purpose of course fattening is a desideratum. Poultry may be fed four times a day at internals of three hours. Plenty of pure water must be supplied for drinking purposes.

(*To be Continued.*)

Preserving the Skins of Birds.

IF THE bird is caught alive it must be carefully killed so as not to injure its feathers. For this purpose raise the wings from behind, with the fingers and thumb of the left hand ; and with those of the right hand, press that part of the body close adjoining to and underneath the wings, as hard as possible. This pressure will exert an action upon the heart, and cause the death of the bird instantly.

But when the bird is shot, take it up by the legs ; by which means the blood will not run through the feathers, but be detained by the reversed position of them. Should, however, any run, scrape it off carefully with a pen-knife when half-clotted, then lay the bird in a cool place, to stiffen. Next wash the feathers clean with water, should any of them be dirty: observing to keep rubbing them downwards with the fingers, whilst drying to prevent them from sticking together.

In skinning the bird, place it upon a towel laid on the knee. Procure a sharp pen knife, having a lancet-shaped point ; also several small needles or sharp wires; thread : raw or uncarded cotton, for stuffing ; wooden skewers, for clearing out ; glover's or surgeon's crooked needles, for closing the orifices; and, lastly, a mixture of a table spoonful of corrosive sublimate (chloride of mercury) in a quart of rectified spirit, which should be allowed to stand overnight, and poured off from the undissolved part next morning. Then open the skin of the belly of the bird, from the breast bone to the vent; carefully stopping every aperture with cotton, in order to absorb any fluids which may escape during the operation; and, particularly, observing first to stuff the beak and nostrils with cotton. Skin the bird, by blowing aside the feathers, and making anincision with the knife from the breast-bone to the vent: the skin may be then separated on each side with the knife; always filling up with fresh cotton, as before directed, until the thigh is reached: then sever the joints of the legs from the thighs; and either take out the thighs, or cut through the joints. Then separate or divide the back-bone from the rump; and proceed, by drawing out the body; cut the joints of the thigh-bones from the body, and also cut away the shoulder bones from the breast.

Make use of the knife, at the ears, only cut through the middle of the skin at the eyes, with the edge of the knife turned upwards. Leave the scalp and jaw bones adhering to the skin. Rub the top of the scalp with the antiseptic mixture. Let cotton be introduced between the scalp and the skin on the top of the head, to loosen and separate it. Separate the body entirely from the skin. Clean the wing and thigh-bones: wrap them round with cotton, and touch them with the mixture. Take out the rump. Touch the inside with the mixture applied upon cotton, wrapped over and between a cleft stick which is stuck through the cork of the bottle. Sew up the body, and stuff it with cotton. Apply the mixture, by means of the cottoned skewer, inside the mouth, nostrils, etc. Clean the eyes and mouth. Fasten the upper and lower beak, with a needle and thread. If the thigh bone is broken, unite it, by putting a needle, wire or skewer, inside of it.

To shape the bird, stick one end of a needle underneath and into the beak, and at the other end affix a cork; place the bird in a deep box or case containing cotton; so that the cork which supports the beak may rest on the ledge of the box, whilst the body, wings, tail, etc may be supported and sustained in any required position, by packing the cotton accordingly beneath them. Whilst drying, the feathers may be displayed to the utmost advantage, from time to time, at pleasure; and the feet brought to shape, and punctures made in their solid parts, to which a little of the solution may be applied. The head may be stuffed into the natural shape, through the orifices of the eyes; and wires, inserted into the feet to attach the bird to a branch. The bird will thus retain the shape given to it when dry.

Button Making from Date Seeds.

OWING to lack of observation, we are letting many opportunities of money-making slip away from us. There are many raw materials in this country which can be converted into useful articles with very little labour and capital and no complicated machinery and thus provide employment for the educated middle-class youngmen, who are at present idle for want of suitable work.

Date fruits are consumed in India in large quantities owing to their nutritious and medicinal properties. We eat the fleshy part of the fruit and spit out the seeds. The date stone is hard but useful. We cannot conjecture how valuable it would become when turned into a sleeve-link or button.

The stones need some preliminary cleansing before they are fit for being manufactured into buttons. Rubbing with a rough moist cloth will remove the husks but to break the shell which covers the inner seed is difficult. Before however, trying to split this reddish-brown colour, scrape it with a sharp knife a little to make sure of the ivory-like colour of the stone inside. Having satisfied yourself that the labour shall not be in vain, you are confronted with the tough task of removing this shell-skin. The easiest way of doing it is given below. Soak the seeds in any oil such as sesamum (teel) for a day or two. Then take them out and mix them with fine sand fairly moistened with soap. Place the whole mass in an earthenware decanter and vigorously rub with a towel the sand-covered seeds. In a short time the outer cover will be peeled off, showing the glittering white stones.

The next step is to bore holes in the middle of the seeds. In an hour one workman can easily drill holes in eighty seeds. A carpenter's drill will serve the purpose. Ordinary brass wire of 1/20th inch thickness, should be cut up into small lengths and made into eyelets. Take an eyelet and a bored seed. Passing the two ends of the eyelet through the hole in the stone, the ends should be firmly fixed on the other side. Fnish all the seeds similarly.

What remains is to make an oval or better a snake loop from small brass wire bits and join the stones in twos. The stones separately finished will make excellent coat buttons. After manufacturing as detailed above, the links or buttons as the case may be, have to be fixed on small square cards with the name and address of the manufacturer.

Everything has been said about the process of manufacture. But the difficult part of the enterprise, the collection of stones has not been touched upon. Under present conditions it is impossible to collect them. The remedy lies in educating the consumer and the grocer as to the value of the stones. The grocer will be only too glad to get an additional profit by selling the fruits without the seeds and the consumer will heave a sigh of relief at the reduction of the price of the dates and therefore will consume more fruits to the obvious advantage of the dealer. Therefore it is only necessary to convince the trader that it is to his advantage and gain to sell pulped dates. The difficulty of collecting seeds can thus be got over.

The capital required for starting this business may be anything from Rs. 25 to Rs. 100. The necessary tools are merely a carpenter's drill and a pair of pliers costing on the whole about Rs. 7. Besides these, you will have to provide yourself with some yards of brass wire, washing soap and a rubber stamp for impressing your name and address on the stationery you use.

With an outlay of Rs. 100, you can turn out singly 10 grosses a week of 42 hours at a cost of Rs. 35. The same can be marketed at the lowest for Rs. 45. Therefore you can easily earn Rs. 40 a month. You can produce more, if you work for greater hours. After your buttons have become fairly well-known. You can employ others to work under you and thus become a factory owner, earning any sum from Rs. 3000 a year upwards.

—By Mr. G. A. Krishna Murthi,
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Mylapore, Madras.

Ideas for Small Capitalist.

Mr. B. Dakshinamurty, Bethander, Gudivada sends the following :—

Lemonade Powder.

Take 1 lb. of sugar, 4 ounces of soda bicarb, 3 ounces of tartaric acid and 1½ ounces of essence of lemon. Mix them together by pestling and keep the same in a corked phial. One teaspoonful of this powder is sufficient to prepare a glass of lemonade. It is indispensable to travellers in absence of lemonade. Manufacturing this will command a brisk and profitable sale. I have tried this on a small scale and found successful.

A small capital of Rs. 5 is enough for starting the business. On the whole Re. 1 profit is guaranteed for a day. Directions for preparing the lemonade water may be printed on slips of paper and labelled on the phials.

Ointment for Sharpening Cutlery.

Heat on fire in a closed vessel equal quantities of salt and iron sulphate and then powder and sift. Mix the powder with lard for use. Keep the ointment in tin pots and label them. Five rupees of capital will enable you to earn 10 rupees or more, as profit.

Bone Business.

Messrs. Chohan Bros, Hafizabad sends the following :—

Bone business in these days is yielding good profit and the following idea of mine will be beneficial.

The capitalist should buy 10 animals of burden, say donkeys, asses, etc. (good animals for the said purpose can be had at a price of Rs. 40 each conveniently) and engage ten men (sweepers or coolies will suit) to look after them ; they can easily be had on a monthly pay Rs. 20 each. The capitalist has now got for the bone business a man for each animal ready for the work to start with. Now he should send these men with the animals in the surrounding villages to collect bones of all kinds and a man can easily procure 2 maunds daily. After allowing for ups and downs and unforeseen circumstances count each man's gathering for the month at about 45 maunds.

Thus the monthly expenses including the fodder expenditure of the animals come up to Rs. 365 approximately including Rs. 15 as contingency charges while the monthly collection of bones comes to 450 maunds. The bones can easily be disposed of at Rs. 1-8 per maund from which deduct the expenditure. The net income comes to about Rs. 300 monthly.

The following shall be the figures for the year ;—

EXPENDITURE.

10 animals costprice (at Rs. 40 each)	Rs. 400
10 men (at Rs. 20 each monthly)	Rs. 2400
10 animals up-keep (at Rs, 15 each monthly)	Rs. 1800
Total	Rs. 4600

INCOME.

Total collection of bones at 450 maunds a month comes to 5400 maunds disposed off at Rs. 1-8.	Rs. 8100

Thus the anual income will come out Rs. 3500 without any hindrance. In course of time the income may be increased if the number of animals be increased. Rs. 400 yearly must be kept or reserved for animals, etc.

Small Trades & Recipes.

Corn Salve.

(I)

Salicylic acid	6 dr.
Methyl salicylate	2 dr.
Wool fat	2 oz.
Yellow wax	2 oz.
Lard (benzoinated)	11 oz.

(II)

	By parts.
Salicylic acid	100
Hydrous wool fat	100
White wax	100
Soft paraffin	100
Creosote	50
Cocaine	1

Indian Vegetable Hair Dyes.

(1) Mix equal parts of chalk and soap and half the quantity of lime ; rub in a leaden pestle and mortar until the mixture acquires a bluish colour ; apply this to the hair, rubbing in ; tie up the hair within a cloth for about an hour ; wash ; thereafter apply a paste, which has been allowed to ferment to some extent, made of wheat flour, pulverised iron filings, and yeast ; tie again for another hour ; wash in a strong infusion of galls or of amla (the Emblic myrobalan) the latter being cheaper ; thereafter apply an oil to give a gloss. The colour thus obtained is very black and perfectly fixed, being rendered useless only by the growth of the hair below which reveals the original colour. (2) Rub *henna* (Lawsonia) leaves on the hair and tie for an hour ; wash ; apply thereafter a paste of indigo or indigo leaves ; wash and fix with the galls or *amla*. This gives a bluish black, but as the indigo becomes rubbed off, the *henna* gives the hair tips a red tinge.

Detroying Ants.

Sodium arsenate	115 grs.
Sugar	1 lb.
Honey	1 fl. oz.
Water	2 pint

Dissolve the sodium arsenate and the sugar in the water, boiling ; add the honey, and when cold pour into shallow dishes in which are placed pieces of bread or sponge.

Waterproofing with Casein.

Casein waterproofing is carried out by stirring casein into a cream with water and adding 25 per cent of its weight of slaked lime, then dissolving casein in alkali solution, mixing the solution, impregnating the fabric with the mixture and passing it through aluminium acetate solution which precipitates an insoluble aluminium caseinate.

Soap Dentifrice.

Thymol	0.05 gram
Extract of krameria	1 ,,
Glycerin	10 ,,
Light magnesia	0·5 ,,
Borax	4 ,,
Oil of peppermint	20 drops
Hard soap	30 grams

Razor Paste.

Lard	50 grams
Yellow beeswax	25 ,,

Melt, add, mixing carefully,

Powdered slate	50 grams
Oil of lavender	4 min.

Boil for five minutes with constant agitation. Cool, and when the mass has set, cut into tablets.

SCIENTIFIC AND INDUSTRIAL TOPICS.

Fuel of Human Engine.

To appreciate the true function of sugar in our daily lives we must consider that most wonderful of all machines, the human body. It is the original internal combustion engine. The automobile engine but illustrates the principles which maintain life in our bodies. Neither of the two engines, the human body or the automobile, can function without fuel. Neither of them can continue to run without replacements and spare parts. In the human body, protein and fats replace the worn-out muscular and other bodily tissues. The fuel which drives the engine is made up of carbo-hydrates, so-called, and of these the most powerful is sugar. It means to the human engine what high test gasoline means to your automobile. The well-known measure of food value is the heat unit known as the calory. One pound of refined sugar represents 1,820 calories of energy,

Mineral Oil Soaps.

The idea of manufacturing soaps with mineral oils, instead of using expensive animal or vegetable oils, is perhaps nothing new, but it has never been realized in a practical form. The direct substitution of a mineral oil, such as benzine, ligroine, petroleum or paraffin, for grease or oil is impossible, because these and similar substances will not lather with a solution of sodium hydroxide, their chemical composition being entirely different from that of grease or oil. But, the nature of mineral oils is so similar to that of vegetable oils in many respects that the action of the former may be reasonably taken into consideration for the production of soap-forming substances. It is a fact that success has now crowned the efforts to combine ordinary soaps with mineral oils or similar substances to form homogenous soaps. As all mineral oils are really nothing more that carburetted hydrogen in a liquid form, there is naturally a large choice of such materials available, chloroform, etc, exercising a similar action to carburetted hydrogen substances. According to a German patent solid soaps in powder form which are mixed with carburetted hydrogen substances, chloro-carbonic hydrogen, etc., can be welded together under high pressure to form a uniform mass which will retain its shape. These soaps have good keeping properties and are for the most part transparent.

Testing Bridges.

A very simple and easily applied apparatus has been devised by a British central station engineer for testing the strain on portions of bridges. It consists of two light hollow spars about

4 feet long, various metal clamps and clips, and a dial reading to one-thousandth part of an inch. When applied to, say, a bar of a bridge, the two spars are arranged in line with the outer ends clamped to the bar at points eight feet apart. The inner ends of the spars are clamped in a particular way in connection with the indicator, so that when the bar is extended or compressed as a load passes over the bridge the total strain is recorded on the dial. This instrument was recently tested with great success on a large British railway bridge.

Wireless Underground.

Although wireless telegraphy has been used so largely on the surface and in the air, very little has hitherto been done to utilise it as a means of communication underground. The possibilities in this direction are illustrated in a very interesting fashion by experiments recently made in a British coal mine. An aerial was set up in an underground region a quarter of a mile distant in every direction from the open. With quite a small apparatus signals were heard from a number of high power transmitting stations, including the large station near Berlin.

Photography on Leather.

In these days, when there is a distinct revival in art leather work, it is a pleasure to note novelties which have a bearing on this development. A British inventor who has had a wide experience in the light leather trade, has produced photography on leather which are a distinct advance on anything achieved before. By means of his process anything possible to photograph can be reproduced on leather : the pictures are durable, and are not affected by rain or direct light, and show no ill effects on stretching. The process seems specially suitable for such purposes as handbags, and pocket books, ladies' hats, and bookbindings, and deserve attention. Some of the flowers reproduced on leather are very beautiful, but an infinite variety of subjects can be done by his process, these including reproductions of old pictures, prints, etchings, landscapes, and one's own portrait. The cost is low and the work artistic.

Iodine as Fertilizer.

Research has recently been carried out which has shown that iodine may play an important role in soil fertilization. As with humans, where iodine has been shown to be an essential to health, only minute amounts are advisable to produce good results ; in fact, poisoning may be brought about as easily in plants as in humans. Experimentation has shown that the application of about one pound of iodine, as potassium iodide, per acre resulted in an increase of yield amounting to about one and a half tons of sugar beet per crop. Sea salt for human food and Chilean nitrate for plant food are carefully purified of iodine before being put on the market. It has been suggested that it may be a wise plan to dose the community with a minute amount of iodine added to salt or domestic water used for human consumption, as is done in Austria. Some engineers believe that inclusion of the minute amount of iodine needed to stimulate plant growth could be made to all commercial nitrate from Chile, thereby enhancing the product for fertilizer purposes at a negligible cost to the producers.

A Giant amongst Men.

Kazanloff is the name of a Siberian Giant lately exhibited in Hungary. He is 9 ft. 3 ins. tall, and weighs 458 pounds. His chest measurement is 56 ins, his head is 25 ins. in circumference, his hand from finger-tip to wrist measures 13 ins. and his foot is 21 ins. long. He consumes a quantity of food equal to that of 4 adults of vigorous appetite. The man is described as sluggish and inactive passing most of the day in sleep, and inclined to doze when alone and not aroused by hunger. He is now only 34 years of age.

Light from Trees.

A French scientist has discovered a means of extracting and harnessing the electricity in trees. He connected a copper plate buried in the earth with a galvanometer, a delicate instrument which measures the strength of weak currents of electricity, and obtained a record of the current passing through the tree.

With three trees connected in the same way, the power was increased, the experiment, with a like result, being continued until twenty trees were linked up in this fashion.

The scientist then placed two copper plates in the earth, about six feet apart, and with the current thus obtained lighted a small electric lamp.

Whether the idea can be extended to be commercially worth while has yet to be determined.

A Laughing Plant.

A naturalist recently returned from Arabia has described to a learned society a plant called the "laughing cactus. The plant gets its name from the fact that anyone eating its seed gives way for some minutes afterwards to immoderate laughter, frequently ending in nervous prostration.

The natives of the district in which the plant flourishes dry the seeds and grind them into powder, which they keep, and on suitable occasions administer to those against whom they have a real or fancied grievance.

An overdose may result in temporary loss of reason following which the victim falls into a deep sleep, awakening with no memory of his curious conduct.

Crowded Earth.

An eminent German geographist and geologist, after studying the whole question of food production of the earth, arrives at the conclusion that the latter can support at the utmost 9,000,000,000 persons. The earth supports at present about one-fifth of this potential population, and if the inhabitants of the world continue to increase in the same ratio as during the past fifty years they will fill the earth in 300 years. He also calculates that when the population of the earth has reached 8,000,000,000, five-eighths of those people will live in the tropics and three-eights in the temperate zones.

FORMULAS, PROCESSES & ANSWERS.

Casein and its Compounds.

2380 C. S. P., Jalgaon. Asks how to dissolve casein in water: also about the uses and properties of casein compounds.

Pure casein is almost entirely insoluble in water but it will dissolve in water containing carbonates, phosphates, alkalies or even alkali chlorides, weak alkali being the most efficient solvent. Casein is readily soluble in lime water.

When casein solutions are treated with acids, a flocculent curd is precipitated, which may consist of a compound of the casein with the added acid.

Alkali salts of casein are obtained as dry powders by concentrating, *in vacuo*, solutions of casein in caustic alkalies, alkali carbonates, sodium phosphate on milk of lime.

In one or other form casein is employed in a large number of industries. It is used in paste and dry distempers; in cardboard manufacture, paper glazing, leather dressing, soap manufacture, cotton sizing, dressing for textiles, finishing, waterproofing, calico printing, cask glazing; imitation picture mouldings, sealing bottle, cabinet and pionoforte making; emulsions, fining wines, boot polishes, waterproof cements, polishes, films, diabetic and protein foods. It is employed as an adhesive in joining aeroplane parts.

With salicylates casein forms soluble compounds, which find an application in therapeutics by reason of the readiness with which they are absorbed. The mercury, silver, and iron compounds of casein possess properties which seem to render them useful, both technically and medicinally. Casein acts as a weak acid and forms salts which are neutral toward phenolphthalein, but alkaline towards litmus. Neutral compounds are well adapted for painting, whilst the compounds acid to phenolphthalein are of special importance for dietetic and similar purposes. A compound of casein and formaldehyde has the bactericidal properties of the latter without its irritating action.

Preparation of Vegetable Alkaloids.

2412 P. S. R., Chodavaram. Requests us to describe a process for the preparation of alkaloids from vegetable sources.

The isolation of alkaloids from plant materials follows to a certain extent the same lines whatever the nature of the alkaloid, but some being more prone to hydrolysis than others require expensive low-boiling solvents for their extraction; while many, as for instance strychnine and quinine, may be boiled with water with relative impurity, so that they are extracted by less expensive methods.

Speaking generally, the procedure is to remove by means of a solvent the bases present in the plant, leaving the sugar, starch, protein, and pectenous matter unextracted. Fats, if present, accompany the bases ; chlorophyll may or may not do so, according to the solvent. The solvents emvloyed are very numerous ; alcohol, fusel oil, benzene, solvent naphtha, ether, and petroleum being variously employed according to the circumstances. If benzene, solvent naphtha, or petroleum is used it is necessary to set free the bases in the plant by treatment with lime or alkali, since the alkaloids are present in combination with weak acids and are as a rule insoluble in this condition in these solvents. Many suitable extraction plants for use with volatile solvents have been designed. These are generally constructed on the principle of the well-known Soxhlet extraction, the solvent refluxing from the condenser into the material packed in the upper part of the lower vessel. The extract percolates through into the lower half of this vessel, from which it is voporised to the condenser, leaving the extract.

The solvent is next extracted with dilute acid ; in some cases, it is unnecessary first to distil away any of the solvent, but usually the greater part is first removed. The weak acid extract is frequently concentrated *in vacuo* before neutralisation, and thus is obtained in very crude form the total alkaloid of the plant, admixed with a certain amount of sugar and so forth. Fat is removed at this stage by extraction with benzene or petroleum, in which the salts of the alkaloid are not soluble. The further treatment and the long and tedious separation and purification of the alkaloids must be varied not only with each kind of material but with every batch and requires great skill and experience and extremely careful workers.

Waterproofing Oilskins.

2529* J. K. T., Calcutta. Wants to learn the process of waterproofing oilskins.

Boiled linseed oil is employed for waterproofing garments, known as "Oilskins" which are used very largely by seafaring men and others exposed to all kinds of weather. The fabrics, coats, leggings, hats, etc , are in this case previously made up from a strong cotton material and are treated with the boiled oil by hand. After each coating of the material has been applied the garments are hung up in an airy shed until they are thoroughly dry, otherwise the composition will remain sticky or tacky. The oil used for the above purpose is best boiled, or "double" boiled linseed oil, to which driers are sometimes added, but these latter tend to make the material brittle, although they hasten and improve the drying. Beeswax melted by heat in the oil is also used and has some advantages.

Dyers' Soaps (Marseille).

2512 P. K. D. R. S. C., Madura. Wants to learn the preparation of soaps used in dyeing such as Marseille soaps.

Soap is used to a fairly considerable extent in the dyeing of cotton goods. The object is to bring about a brihtening effect on the colour, while the operation tends to fix the colour on the cotton better. The soap has also a tendency to enter into combination with the dyestuff on the mordant on the other, so that a triple combination of soap, dye and mordant is fixed on the cotton, which is faster and brighter than a simple combination of dye and mordant.

The best soap for this purpose is a green olive oil soap, made from sulphur olive oil, and known as Marseilles soap. This is made to contain 62 to 64 per cent of oil, with a corresponding proportion of alkali and water.

Olive-oil soaps are fairly soluble, and leave no unpleasant odour behind them. Palm-oil soaps also work well ; they are not so soluble as olive oil soaps ; they have a pleasant, characteristic odour, and do not go rancid. Tallow soaps have been and are sometimes used, but they lack solubility, and have some tendency to go rancid, hence their use is not advisable.

Preparation of Sodium Silicate.

2529 J. K. T., Calcutta. Asks how sodium silicate is prepared.

Silicate of soda is generally prepared on a large scale (1) by melting silicious sand with sodium carbonate or (2) by substituting a mixture of sodium sulphate and carbon for the sodium carbonate in the preceding method.

The operation is carried out in a specially constructed gas-fired furnace heated at about 1100°C. for 5 to 8 hours, The fused product is run into an iron receptacle to cool. Typical mixtures for the charge are : 28 lb. calcined sodium carbonate or 60 lbs sodium sulphate and 15-20 lb coal, to 100 lb. powdered quartz ; or 110 lb. sodium sulphate and 10 lb. coal, or 100 lb. of 50 per cent. sodium carbonate and 3 lb. coal to 180 lb. white sand ; the coal assists reduction.

The fused product is broken up by a stone breaker or ground by suitable machinery, and dissolved in water by long boiling, best under pressure. The resulting solution, clarified by standing, is evaporated to 40°Be in iron pans, 100 lb. of the solid yielding about 300 lb. of this solution. Sulphide, when present, may be removed by adding some copper scale or litharge when preparing the solution.

A pure silicate may be made from the crude product by passing a current of carbon dioxide through the solution, filtering off the precipitated hydrate, silica, and redissolving it in caustic soda.

Cement for Tortoise Shell.

2357 N. B., Tuni. Wants a recipe for joining tortoise shell.

(1) Mastic	30 parts
Shellac	90 ,,
Turpentine	6 ,,
Spirit of wine (90 p. c.)	350 ,,

The above will yield a very good cement.

(2) Here is process of welding tortoise shell. The edges to be united are shaved and scraped to a feather edge, and laid together with a piece of fresh shell upon them. The whole is next subjected to a moist heat (as of hot water), which softens it, and it is then put under great pressure until the parts are united, after which the surplus thickens is removed as waste.

Bronzing Iron and Tin.

2518 ,K. M., Jamadoba. Asks how to bronze iron and tins.

(1) Iron may be bronzed as follows. First clean the objects ; then subject them for about 5 minutes to the vapour of a mixture of concentrated hydrochloric and nitric acids ; then smear them with vaseline and heat them until the vaseline begins to decompose. The result is a fine bronzing.

(2) In case of tin articles they are well washed and all grease removed ; next plunged into a solution of copper as (green vitriol) 1 part ; sulphate, 1 part ; water, 20 parts. When dry they are plunged again into a bath composed of verdigris, 4 parts ; dissolved in distilled wine vinegar, 11 parts. Wash, dry, and polish.

Lemongrass Oil.

2488 D. S., Mangalore. Desires to be acquainted with the use of lemongrass and wintergreen oils.

The oil is stimulant, carminative, antispasmodic and diaphoretic : locally rubefacient. Useful in flatulent colic and gastric irritability. In cholera it proves serviceable not only by allaying and arresting the vomitting but by aiding the process of reaction. Externally applied it forms an excellent embrocation in chronic rheumatism, neuralgia, sprains, and other painful affections.

Wintergreen Oil.

The leaves of *Gaultheria fragrantissima* or Indian wintergreen yield a fragrant volatile oil which is practically identical with that of the true wintergreen. It consists almost entirely of methyl salicylate and is the source of natural salicylic acid, which it contains to the extent of about 80 to 90 per cent.

The oil is aromatic, stimulant and carminative. It has been given with success in acute rheumatism and sciatica, its properties corresponding to those of the salicylate, in doses of 10 minims gradually increased preferably in capsules. The oil is also applied externally in liniments or in the form of a suitable ointment. It has powerful antiseptic properties, and may be used in small quantity for preserving vegetable preparations. It is also used as a pleasant flavouring agent, especially for dentifrices.

Glazed Almonds.

2228 M. L. N. L., Delhi. Requests us to publish the method of glazing almonds.

Glazing almonds forms an important task to fruit dealers of India but the process is not very difficult. Boil 1 pound of sugar ; then place 1 lb of small selected almonds in the sugar, and boil until the latter is mealy, when the boiler is taken from the fire, its contents are poured upon a metallic plate and the almonds are picked out. The remaining sugar is brought back into the boiler, stirred into a thin paste with water and boiled until it draws threads, when the boiler is taken from the fire. Now pour the almonds into the sugar, stir them quickly, and before the sugar congeals pour them back upon the metal plate so that they lie flat and at same distance from each other. Put the plate for a few minutes into a hot oven and them for 6 hours in the drying even.

To Frost Silver.

1879 P. K. R, Kamarhaty. Wants a process of frosting silver.

The surface of the article to be frosted must be first burned with a gas or other flame and blow pipe for about a minute. Then pour a small quantity of sulphuric acid into some warm water sufficient to give it a strong acid taste. Dip the article to be frosted into it for a minute or two, and if that has not the desired effect, boil it, then wash it with soap and water. If it is desired to burnish portions of it do it before washing with soap and water as the silver is then soft. All iron, such as pins of brooches, must be removed before the silver is put into the acid.

Dressing Small Skins.

2172 J. K. D, Rajahmundry. Writes, how to dress small skins.

The skins should be treated as freshly as possible. Cut open the skin so as to get at all fleshy parts, then get some rain water and well soap them; let them lie for six hours in the water, then well rinse them in clean water, take off all fat and flesh that may adhere to the skin. Then get some bran, and put some in the bottom of a pan, or tub, putting a layer of bran between each skin, then put in cold water, till by pressing the bran on top of the skins the water comes through, let them stay for two days. Prepare a mixture of 3 parts ground alum and 1 part salt into a paste by adding cold water, and well rub into every part of the skin on the fleshy side, then make a wooden frame, and stretch the skin on it; let it lie, hair downwards, for twelve hours, then go over with the mixture again. Hang up to dry, in the sun. Before they get quite dry, get a piece of pumice stone and well rub the inside of the skin, all the fleshy part will peel off, and leave the skin white, and if the pumice stone be perserved with, will be perfectly pliable. If the skin should be an extra hard one, go over with the mixture again, adding a little more water, and finish again with pumice stone.

Grafting Plants.

1933 L. R. B., Berhampore. Asks how plants are grafted.

Grafting is performed in a great many different ways, but the most eligible for ordinary purposes is what is commonly called splice grafting, or whip grafting. In executing this mode both the scion and the stock are pared down in a slanting direction; afterwards applied together, and made fast with strands of bast matting.

To insure success, it is essentially necessary that the alburnum or inner bark of the scion should coincide accurately with the inner bark of the stock; because the vital union is effected by the sap of the stock rising up through the soft wood of the scion. After the scion is tied to the stock, the graft is said to be made; and it only remains to cover the part tied with a mass of tempered clay, or any convenient composition that will exclude the air. The season for performing the operation is, for all deciduous trees and shrubs, the spring immediately before the movement of the sap. The spring is also the most favourable season for evergreens; but the sap in this class of plants being more in motion during winter than that of deciduous plants, grafting, if thought necessary, might be performed at that season.

Chlorine Gas and Borax Soap.

2091 I M. W., Cocanada. Requires hints for the preparation of chlorine gas and borax soap.

Until recently all the chlorine produced was made from hydrochloric acid, either by the Weldon or by the Deacon process, the hydrochloric acid for the purpose being obtained by treating salt with sulphuric acid (salt cake process). Within the last few years, however, more than half the world's supply of chlorine has been obtained by electrolysis of brine solutions, which latter method yields, according to slight alterations in the conditions of electrolysis, chlorine, chlorates, bleaching solutions, also caustic soda and sodium carbonate.

In moderately large scale chlorine is readily obtained by the action of hydrochloric acid on natural manganese dioxide. The operation is carried on in vessels of cast iron or earthen ware containing hydrochloric acid and manganese. These are heated with hot water or steam, and when the reaction has finished, the mother-liquors, which contain manganese chloride, are removed by syphons and used for the regeneration of chlorine and manganese dioxide. The delivery tubes for the chlorine are constructed of lead or earthen ware. The heating operation lasts twenty-four hours altogether.

Borax Soap.

Here are a few recipes for preparing different kinds of Borax Soap:—

(1) Borax Soap.

90 lbs. good soap and 10 lbs. borax.

(2) Borax Dry Soap.

25 lbs. soap, 60 lbs. soda crystals, 5 lbs. borax, 10 lbs. refined alkali. A better quality can be made from 25 lbs. soap, 10 lbs. refined alkali, 50 lbs. soda crystals, 15 lbs. borax.

(3) Borax Soft Soap.

Tallow or fat 20 lbs. Soda lye (15° B). 20 lbs. Potash lye (10° Be) 12 lbs. Solution of Borax (10° Be) 3 lbs.

The soda lye is added to the melted fat and heated till it forms a clear liquid or is combined, when the potash lye and borax solution are added. It should be a semi-solid translucent paste, and is usually sold in quart cans.

Macassar Oil.

2270 M. R., Ajaigarh. Enquires about the source, uses and properties of macassar oil.

Macassar oil is obtained from the seed of Schleichera trijuga, Willd, known as The Lac Tree or Kosumba or The Ceylon Oak.

The seed is comminuted, pressed, or boiled in water, and the oil collecting on the surface carefully lifted off. It is reputed to be the original macassar oil which later on reappeared in German commerce under that name and attained celebrity.

Considerable quantities of the oil were formerly exported from this country.

Genuine macassar oil is of a semi-fluid consistency at the ordinary temperature, of a yellowish-white appearance, and in odour slightly resembles oil of bitter almonds. It is stated that the oil is a valuable stimulating and cleansing application to the scalp, which promotes the growth of the hair. It has been long used by ayurvedic practitioners for the cure of itch and acne. The beneficial action of the oil is ascribed to the hydrocyanic acid which it is said to contain.

The oil is also used in Malabar for culinary and lighting purposes. What at present comes into commerce under the name of "macassar oil" is mostly a mixture of coconut oil and ylang-ylang extract, coloured red with alkanet.

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Raw Meat Juice.

2412 P. S. R., Chodavaram. Asks how raw meat juice is prepared.

The juice of raw meat is an invaluable remedy in sickness. To prepare it any meat will do. Take a piece, remove all the fat; then mince the meat; after which cover the mince with as much water as it will absorb in four or five minutes; then reduce the soft mass into a pulp in a mortar by means of a pestle. Pass this pulp through a cloth forcibly; the fluid which passes through the cloth is meat juice. Children will take this readily without any addition being made to it. In the case of adults, however, it can be made palatable by the addition of a little salt or sauce. But whatever is done to this juice to make it palatable, on no account add mineral acids, or cook it, as in both cases the albumen of the juice becomes coagulated, making it less digestible. Where ice is procurable, meat in this form can be conveniently kept fresh for more than fourty-eight hours. Where ice cannot be obtained and the climate is hot, the juice should be extracted from the meat fresh each time it is to be given.

Preparing Turmeric for Market.

2053 N. G., Bombay. Wants to know how turmeric is prepared for the market.

Turmeric is extensively cultivated all over India for its rhizomes.

Various systems are in vouge in different places for preparing the rhizome for the market. In Bengal after the rhizomes have been dug out of the ground, they are freed from the fibrous roots and cleaned. They are then put in earthen pots, the mouths of which are to be carefully closed with earthen covers and cowdung. These pots are then very gradually heated. The turmeric is made to boil in its own juice, a process which gets rid of the raw smell of turmeric. It is then dried in the sun, the drying taking nearly a week, during which the turmeric requires to be covered in the night to protect it from dew. In some places turmeric is boiled in water in which a little cowdung has been mixed. In northern India the method is different. When dug up the root are boiled and dried in the sun; in this form they are the turmeric sold in the bazar. In the Punjab the tubers are taken up in winter and dried partly by the action of fire and partly by exposure to the sun. In south India the roots are carefully sized and separately boiled in a mixture of cowdung and water, dried and sent to the market.

Turkey Red Oil.

2515 P. K. D. R. S. C., Madura. Requires the process of making Turkey Red Oil.

Turkey red oil is obtained by the reaction of concentrated sulphuric acid on castor oil, the treatment consists in running into the oil, slowly and with continued stirring, 20 per cent of 66°Be. sulphuric acid, the operation being performed in a lead-lined iron vessel kept cool by means of ice water. After leaving at rest for two or three hours, the mass is thinned down with water and further diluted by strirring in a thin stream of luke-warm soda solution, about three times of crystallised soda to each measure of acid used being employed. The finished product settles out on being left over-night.

Metal Ball Making.

1789 C. K. R., Trichinopoly. Requires hints for making metal balls.

A piece of metal is cut round and put under a press called a "fly," and in the bottom is a hollow cup; in the fly nose is a punch. The metal is put over the cup or hollow, and forced down by the top punch, not all at once, as a set of dies or cup is used to bring it down gradually so as not to crack the metal. When got to semi-pherical shape, they are put in a furnace until red hot, and then cooled. It is thus 'annealed.' When cold they are put into the cups, round parts uppermost, and instead of round punches cup punches are used, with small hole in centre to allow of air escaping, so as not to burst them, granitoid punches being used in doing them. They must be annealed two or three times, otherwise many balls will be cracked. Plenty of oil must be used in the machine so as to keep the balls cool, or they would clog.

BOOKS ! BOOKS ! !
Science of Sex
By Prof. M. D. Price Rs. 2.0
Queen o' the Diamond Rs. 1 ,8
Relations of the Sexes. By Leo Tolstoy. Re. 1
Science of the Sexes. Re. 1. Matrimonial Alliance, By Aristotle, As. 12. Price List Free.
Apply to ;—VALE OFFICE.
(Dept 1), Pondicherry.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of INDUSTRY are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

1440 J. P, Bombay. A formula of lacquer for brass appeared in November 1922 issue. The recipe will be as good for tin also.

1448 S G C, Katwa. A good recipe of incense sticks will be found in May 1924 issue.

1475 P N, Chokkadi. First buy a warping machine and taking that as a model get other similar machines made by carpenter as per order.

1476 B R. L K. L, Ambala City. To watches which go by the name of radium watches is applied a kind of paint known as luminous paint that remains luminous far into the darkness of night, provided it is exposed to the light during the day.

1547 A P. S, Agra. Your enquiry is engaging our attention.

1672 C. V K. B, Madras. Formula of preparing shellac appeared in April 1920 issue.

1673 U J. P, Ahmedabad. For hair oils please go through Hair Oil Manufacture published from Industry Office.

17 6 J R. S. F., Barielly. In your toilet soap use essence *bakul* for perfuming the soap which will produce *bakul* scented soap.

1729 N. G C. C., Amritsar. For different kind of metals you will have to prepare different kinds of solders. For soldering brass use a solder made of 2 parts tin, 1 part lead, by weight; melt, mix and pour in small bars.

1739 A M, Bombay. Boil a little quantity of soap in a seer of water when boiling put the cloth in the water and after boiling for an hour remove from the fire and wash the cloth after some time.

1786 D D, Sunam. Process of preparing duplicator and the ink appeared in June 1924 issue.

1790 V A., Jamshedpur. An article on brick manufacture will appear in an early issue of INDUSTRY.

1865 A. P S, Agra. Your enquiry is receiving our attention.

1043 V V P, Calicut. Formula of sugar candy appeared in May 1922 issue.

2003 C. A. A. A K, Cumbum. For information regarding match industry please go through July 1922 and September 1922 issues of INDUSTRY.

2036 T. D, Hyderabad. Seek legal advice.

2040 R. N, Alwar. Steam engines may be purchased of Marshall Sons & Co., 99, Clive Street, Calcutta. Soap stones may be had of Jagadish Agarwala 26 1, Grey Street, Calcutta.

2041 P. B., Vartej. Carbonic acid may be supplied by The Sirdar Carbonic Gas Co Ltd, Connaught Road, Mazagaon, Bombay and Bengal Aerating Gas Factory Ltd, 8, Clive Row, Calcutta. Creosote oil may be bought of Messrs D. Waldie & Co Ltd., Konnagar, Howrah.

2042 C. B M, Sinor. For preparing amla hair oil write to our perfumery specialist.

2043 B. R., Pilibhit. Process of printing photos on silk handkerchief appeared in January 1924 issue. For removing hair you may use depilatories. The addresses of the journals mentioned by you are not known.

2044 K C J, Lucknow. Coloured pictures are printed on papers either by tri coloured blocks or by lithography. Addresses of picture post card dealers will be found in the advertising pages of Industry. Wants to be put in touch with dealers in Benares pictures.

2045 E. I. P., Kandopola For Homeopathic medicines enquire of Boerick & Taffel Philadelphia.

2046 O S F., Cuttack. Beaume's hydrometer may be supplied by P G. S. Glass Works, Belgachia, Calcutta. You may use soapstone To manufacture caustic soda from washing soda involves a complicated process. Glass phials may be had of S K. De, 124, Shovabazar Street, Calcutta. Essences may be supplied by Sickri & Co, 55 B, Canning Street, Calcutta. Corks and capsules may be had of P. S. Dutt & Bros., 8, Ezra Street, Calcutta Soap moulds may be had of L. B. Verma, Cawnpore.

2047 Roll 17617, Tuticorin There is already a well-known soap called Lucky soap, so you cannot give name to your soap Lucky soap and register it. For trade mark registration write to Messrs P Lodge & Co, P. O. Box 6772, Calcutta Cardboard boxes may be supplied by H L Sett & Sons, 8, Nilmoney Mitter Lane and Dass & Kundu, 20, Gour Laha Street; both of Calcutta. For good printing write to Oriental Printing Works, 327, Upper Chitpur Road and The Fine Printing Works, 347, Upper Chitpur Road; both of Calcutta. We cannot comply to your request.

2048 C. F. I., Paranti Tablet making machines may be had of Calcutta Industries Ltd., 71, Canning Street, Calcutta.

2050 G H B, Bahawalpur. You may go through some back copies of Industry where you will find suggestions From those you may single out one and learn that industry.

2051 S S R, Tholampalayam. Indian casein may be had of G. Ramaswamy Naidu, Krishnarajendra Dairy Farm Doddaballavpur, Bangalore and Peter Debostary 69, Dharamtola Street, Calcutta Foreign casein are manufactured by O Lechla 6. Holborn Viaduct London E C. and the Casein Mfg Co., 15, Park Row, New York.

2054 D. S., Cochin. For the book on dyeing by Dr P C. Roy please write to The Book Company, College Square, Calcutta.

2055 A C S, Baripada. Wants *tauri* and *tasar guli*. Sandy soil is suitable for growing melons.

2056 K. P V., Patna. You will get all particulars from The College of Dentistry, 261, Bow Bazar Street, Calcutta or from School of Dentistry, 26-A, South Parade, Bangalore. Write for its journal to Photographic Society of India, 40, Chowringhee, Calcutta.

2057 R. K. C, Bellary. Book publishers of U S A are: (1) McGraw Hill Publishing Co., New York, (2) Mac Millan Book Co, Syracuse, N. Y. Of England are: (1) The Times Book Club, Oxford Street, London, (2) Longman Greens & Co., London.

2058 U. P., Ahmedabad. Your quiry being in the nature of an advertisement cannot be published in this column.

2059 V. G. G., Poona City. We are not aware of any such journal as required by you.

2060 I. S. M, Tiruperaipundi. Photographic requisites may be had of the Calcutta Camera House, Chowringhee, Calcutta. Watch parts may be had of L M Bysak & Co, Old Court House Corner, Calcutta.

2061 M R, Deccan Bidi making appeared in June 1922 Oils may be solidified by an admixture of paraffin Europeans use a rubber cover over their boots in the rains, snow and mud. Wants to serve as an apprentice in any soap factory.

2062 S. C., Allahabad. See 2032.

Limitation of Family

Third Ed 5 Portraits, 55 Engravings.

357 Pages, Price Rs 3 Postage Extra.

A comprehensive and confidential Treatise Every parent desiring to regulate the number of children according to his health and means will find it a god-send, ask for table of detailed contents which will be sent free K M DAS & CO.,

29-1, Telepara, Sampooker St, Calcutta.

2063 P. R. A. N., Balaghat. Wants books on knitting in Hindi and on Homeopathy in Telugu.

2064 K. J., Moradabad. The hardwares required by you may be had of Anandji Haridas, 20 Darmahatta Street, Calcutta.

2065 R. P. G., Umaria. Bahera yields tannin extract. Try to dispose of your article through stationers. The emblic myrobalan is chiefly used in medicine. Gum, lac, dye and tan are yielded by the Palas tree. Several lakhs of rupees will be required to start a paper and pulp factory. Can supply minerals and forest produce. Formula for preparing quick white for shoes has already appeared.

2066 Q. A. Q., Gujrat. Your query is outside the scope of INDUSTRY.

2067 B. C, Agra. You may enquire of The British Engineer's Association, 32, Victoria Street, Westminister, London S.W.1. for a bead making machine.

2068 S. M. A. S., Nagina. The Bande Mataram Match Factory, Tallygung, Calcutta; Gujrat Solan Match Factory, Ahmedabad; Amrit Match Factory, Kotah, etc are run by power. Wants addresses of all small match factories also.

2069 F. C., Quilon. Formula for removing rust appeared in the last issue. By besmearing iron article with vaseline rust may be prevented.

Cheapest House for
Sporting Goods
Silver Medals, Cups & Shields.
Fine Silver Medals in Velvet lined cases.
Rs. 3-12 Each.
Largest Stock & Variety
Illustrated Lists Free.
CARR & MAHALANOBIS,
Chowringhee Corner, Calcutta.

2070 (Illegible) Bombay. Pharmaceutical chemistry is taught in the School of Chemical Technology, 30/2, Doctor Lane, Calcutta. Homeopathy is taught by correspondence by The Chicago College of Homeopathy, 89, Shambazar St, Calcutta. The following are some of the sugar factories of India Cossipore Sugar Works, Gun Foundry Road, Cassipore, Calcutta. Cawnpore Sugar Works Ltd, Cawnpore. Samastipur Central Sugar Co. Ltd., Samastipur, Dt. Darbhanga.

2071 S. D. C. W., Cuttack. Cottos may be supplied by Md Khoda Bux, 11, Calootola St., Calcutta. Pure sandalwood oil is manufactured by Government Sandalwood Oil Factory, Mysore. Olive oil is the ideal basis for hair oil.

2074 M. T. F, Madras. Try to dispose of your stamps through Calcutta Philatelic Mart, 46, Police Hospital Road, Calcutta or Universal Stamp Bureau, 2, Main Street, Poona.

2075 R. S. C, Travancore. Home printers may be had of S. C. Dutt, 100, Durga Charan Mitter Street, Calcutta. Is willing to place circulars, catalogues, etc on library table free of charge.

2076 S. M. S., Delhi. No stamp has been received, your letters could not be redirected.

2078 N. G. D., Nagpur. Your query has been answered in last issue under No. 1764.

2079 S. C. A., Bangalore. Your query is unintelligible to us.

2080 R. D. M., Laskar. Hosiery yarns may be had of E B. Bros & Co., 11, Dharamtola Street, Calcutta. Glass phials may be supplied by S. K. Dey, 124, Shovabazar Street, Calcutta.

2084 S. S., Tinnevelly. Camphor is not produced in India. Wants addresses of dealers in Burma.

2083 N. S. N. S, Amritsar. You will get, every particular for hair oil making in the Book on Hair Oil you have ordered from the office. A recipe for curry powder will appear soon.

2086 H. R., Rewari. Water glass is the common name for sodium silicate. and may be had of The Industrial Chemical Works, Governmen Gate Road, Parel, Bombay. Soda Crystal and washing soda are same : the latter is generally offered in a powdered state. Temperatures of boiling liquid may be measured by specially made thermometers. Pickles may be preserved in air-tight tin canesters. Pearlash is crude form of sodium carbonate. Perforate of soda is a chemical compound.

2087 P. B. N. E. Baroda. Figure locks of different kinds have been patented and are sold in the market. You may try the lock dealers. The caustic lye should be added until the oil is saponified. Cantharides is bestowed with hair growing properties and therefore mixed in hair oil.

2090 J. M. P., Murshidabad. Try Indian Poultry Gazette, Sperring Retreat, Simla S. W. Poultry dealer : Eric 34, Sheriff Lane, Calcutta.

2091 I. M. W., Cocanada. No licence is required for preparing pyrotechnic, matches. You can steep your splints in weak solutions of aniline dyes. Try Ghosh Brothers, 63J, Radha Bazar Street, Calcutta for the thin paper. Your other queries will be treated in the next issue.

2093 B. B., Calcutta. The eggs should be dipped in molten paraffin (*mom*).

QUITE FREE.
Sample & Price List
of the most popular
Monkey Brand Black
TOOTH POWDER
FOR ALL DENTAL DISEASES.
Apply to—
NOGI & CO., Bombay No. 4.

2094 S. M. A. K, Muzaffarnagar. Wants addresses of wholesale dealers of cut piece cloth of Bombay and Calcutta.

2097 D. D. U, Dharwar. Gypsum and plaster of Paris are the same. In the Bombay Presidency crude gypsum occurs in the marine deposits near the city also in Kathiawar. Very excellent gypsum is found in Kach. In Sind deposits occur near the top of the Gaj-beds of the kirthar range

2098 P. P., Tinnevelley. Sugar, food essences and food colours are principal items in lozenge industry. The required machinery may be had of The Confectioner's Machine Manufacturing Co., Springfield, Mass. U. S. A. and H. Lichtenberg, Magdeburg—N. 28, Germany.

2100 H. N. F., Almora. An article on wool dyeing will appear in an early issue.

2101 S. D. M., Lahore. For learning how to export please refer to 1st and 2nd volumes of COMMERCIAL INDIA. World Directory may be supplied by Kelly's Directories Ltd., 162-184, High Holborn, London W. C. For London directory write to The London Directory, 25, Alechurch Lane, London E.C.4. For German directory write to the Consul-General for Germany, 2, Store Road, Ballygunge, Calcutta. For Japan directory write to The Imperial Commerial Museum of the Department of State for Agriculture and Commerce, Tokyo, Japan.. American directory may be had of Abdur Rahman Azizur Rahman, Ludhiana, Punjab. Indian directory may be purchased of Thacker Spink & Co., 3, Esplanade East, Calcutta.

2102 J. N. V., Ajmer. First procure retort carbon and press it in a hard press. Vernacular equivalents of orris root are : Irsa, sosun in Hindi ; Bekh Sosan, ersa in Kashmiri, Irisa in Punjabi and Bekh-i-banfsa in Persian.

2103 J. S. B., Larkana. Sodium silicate is added to soap as a filling agent on account of its detergent properties Formula of good washing soap appeared in October 1923 issue.

2104 S. A., Gaya. Mica wastes may be used in the production of micaniter. Mica is treated by heat for the preparation of Ayurvedic medicines, Silver copper alloys may be employed in the manufacture of a number of articles What fixed salt do you wish to make ?

2105 J. C. B., Suri. Dip the eggs in molten paraffin and let them dry. There are various processes for preserving eggs It is very difficult to say which process is the best unless it is experimented upon. For the full report you require write to the Director of Industries, Bengal, 40A, Free School St., Calcutta.

2106 M. M , Castle Rock. Match boxes and splints may be had of Bhowani Engineering and Trading Co , 122-1, Upper Circular Road, Calcutta.

2107 G. B P., Padnj. For toy aeroplane enquire of K B Nan, 231, Old China Bazar Street, Calcutta.

2108 G D A., Allahabad. Formula of neem oil appeared in May 1922 issue. A recipe of destroying fleas and insects will be found in November, 1924 issue.

2109 Roll 1314. Please consult a postal guide wherein you will find everything required.

2110 L A C . Kulluree. You may write to Consul General for France, Wadehouse Road, Colaba, Bombay. You may communicate with Consul-General for Germany, 2, Store Road, Ballygunge, Calcutta The Indian Agricultural Journal is published by Messrs Thacker Spink & Co, 3, Esplanade East, Calcutta The full address of Times of India is Times Bldg., Hornby Road Bombay. For perfumery enquire of B K Tandon, Southgate, Kaisserbagh, Lucknow For pyrotechnic go through September 1924 issue.

2111 T. N. R C, Karaikudi. The Indian Colour Printing & Hollow Wares Ltd., 133, Beliaghata Main Road, Calcutta is the only firm in India dealing in printed tin boxes. You may however try the following foreign firms ; Kanai Shoten, Takagaki-cho, Kitano Kita-ku, Osaka, Japan ; American Can Co., New York, U. S. A. and National Enamelling & Stamping Co., New York, U. S. A. Glazed tiles may be supplied by Mosaic Tile Co., Zanesville, Ohio and Beavs, Falls Art Tile Co., Beaver Falls, Pennsylvania.

2114 E. M. A., Aden Camp. The books you require may be had of Messrs R. Cambray & Co., 10, Hastings Street, Calcutta.

2115 M A. Q., Mhow. Your enquiry is beyond the scope of INDUSTRY.

2116 J. C., Tanjore. The strength of sugar solutions may be ascertained by the help of specially graduated hydrometers. Milk may be preserved for a long time by pasteurisation.

2117 D. P , Chatrapur. Articles on rubber stamp making appeared in January and March 1924 issues. Rubber may be had of Gopal Chunder Dass & Co., 74-1, Clive Street, Calcutta

2119 A R S , Palampur. For the required machine, write to the Oriental Machinery Supply Agency Ltd., 20-1, Lall Bazar Street, Calcutta who will indent the machine on your behalf

2120 C. B N , Madras. All the formulae you require will be found in the 14th volume of INDUSTRY

2121 P V S , Dharwar Process of printing photos on handkerchief appeared in January 1924 issue

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Soap & Perfume Manufacturers.

FREE

samples of perfumes for above trade will be sent on receipt of the inquiries from bonafide manufacturers. Excellent qualities of the highest strength Prices lowest. Write for samples to-day

Anglo-Indian Drugs & Chemical Co.,

No. 155, Juma Musjid Circle.
P. O. Box No. 2082,
BOMBAY.

2122 A S. S, Garhwal M R A S is the abbreviative form of Member of Royal Asiatic Society. For rules and regulations write the Secretary of the Society at Park Street, Calcutta. For picture framing accessories enquire of Fouc Lall Seal & Sons, 10, Swallow Lane and Hem Chandra Chunder, 13, Swallow Lane; both of Calcutta.

2123 S V V., Madanapalle. You may write to the Principal, Calcutta Technological College, 30-2, Doctor Lane, Entally, Calcutta.

2124 C M S R, Chitaldrug For securing agency please go through the Sale & Exchange Columns of INDUSTRY

2125 M K. N., Bombay. For training in mechanical engineering write to the loco departments of the railway workshops. Also you may write to the Principal, Bengal Technical Institute, Jadabpur, E. B. Ry., and Bengal Engineering College, Shibpur, Howrah. The following are the mechanical workshops of Calcutta; (1) Bengal Motor Co., 47, Ripon Street; (2) Globe Enginneering Works, 150, Lower Chitpur Road and A Milton & Co. Ltd., 156, Dharamtola Street. You may write to The Institute of Engineers, D/5, Clive Blds., Calcutta.

2126 K. N., Fyzabad. Envelope making machines may be had of Oriental Machinery Supply Agency Ltd., 20-1, Lall Bazar Street, Calcutta and The Industrial Trading & Mfg. Co of Western India, No. 28, Ahmedabad. Electro-plating outfits may be had of Heatley & Gresham Ltd., 6, Waterloo Street, Calcutta.

2128 C. B. N, Madras. For phenol blue enquire of Aminchand Mehra & Co., 34, Armenian Street, Calcutta.

2129 P. V. R., Nagercoil. Prawns cannot be packed in gunnies without rotting. The bags cannot be emptied of air which will enter through the pores. The prawns can possibly be tinned in oil For detailed particulars as to the prospect of shipping them write to the Govt. Fisheries Dept. Madras. We do not quite follow the American's directions quoted by you. Please refer to our article on Tapioca in the September issue The leaves of coconut cannot be kept green in the dry state. They will turn brown

2132 B. S. V, Bombay For ice making machine enquire of Messrs Burn & Co, 7, Hastings St, Calcutta.

2133 B P V, Jubbulpore For securing agency please go through the Sale & Exchange Columns of INDUSTRY.

2134 S. N. A., Kumbakonam. For the *charkas* you require write to the respective inventors of those *charkas*

2135 S D, Badanpur Brushes may be had of H Bevis & Co, Cawnpore and Brushwares Ltd, Cawnpore and Bonner & Co., 209, Cornwallis Street, Calcutta

2136 V. R. B, Meerut For laughing gallery accessories please enquire of Pioneer Mail Supply Co, 93-3, Clive Street, Calcutta.

2138 H. D., Shillong Varnishes of all sorts may be had of Hoemant Karaim, 67, South Road, Entally, Calcutta.

2139 K. P K., Poona City In removing bad smell of coconut oil the treatment in deodorisers has been found very useful. There are two kinds of deodorisers, viz., atmospheric and vacuum type. In the former type the oil is subjected to the heat of both closed and open steam coils. The former should be sufficient to raise the temperature of the oil to the temperature of the steam, while the latter should be sufficient to maintain the oil in an exceedingly vigorous state of ebullition, thus enabling all unpleasant odours to escape into the atmosphere. The oil should not be heated over 250 F. and it is authentically stated the oil is deodorised in two hours. In the vacuum type of deodorisers the oil is similarly treated but at reduced temperatures and pressure and in consequence there is less likelihood of damage to the oil.

2140 B. R. M., Farrukhabad. For metal button making machines enquire of Taylor and Challen Ltd, Manchester and Defiance Button Machine Co., 43-45-17 W, 24th Street, New York, U. S. A. Add acids in very small quantity.

2141 S, .P. N., Kathiawar. In ascertaining the atmopheric pressure you may use barometer. For ascertaining temperature you should use thermométer.

2142 G, P. M., Gandara. You may write to the following service securing agencies, Service Procuring Agency, London House, Landsdowne' Road, Apollo Bunder, Bombay; Employment Bureau; Kirloskar Theatre, Poona City and Service Securing Agency, Delhi. For securing agencies go through the Sale and Exchange Columns of INDUSTRY. There is no other journal known to us either in English or in vernacular like INDUSTRY.

2143 J. S., Bareilly. Wishes to buy palm oil. You may go through Tobacco by A. E. Tanner.

2144 S. R. S. B., Delhi. An article on phenyle appeared in October 1921 issue. The chemicals may be had of B. K. Paul & Co., 1-3 Bonfield's Lane, Calcutta.

2145 K. L., Cawnpore. Formula of hair curling lotion appeared in September 1924 issue.

2146 K. B., Allahabad. Nib making machines may be had of Bengal Small Industries Co., 91 Durgacharan Mitter Street, Calcutta.

2147 S. I., Masulipatam. Wishes to buy hingli and motihari tobacco.

2149 N. E. C. C., Calcutta. Bakery machinery may be supplied by Paul Teller & Co, Halle a Saale and W. Mark & Co., Halle a Saale ; both of Germany.

2150 E. I. C., Multan. For the list of all the joint stock companies of India write the Registrar, Joint Stock Companies, Government Place, Calcutta. There is no such directory ; you may consult Kelly's World Directory.

2151 S. P. Y., Ahmedabad. For hosiery knitting machines write to the Secretary, Chamber of Commerce, Tokyo ; Indo-Japanese Association, 3, Itchome, Yuraku-cho, Kojimachi-ku, Tokyo and Foreign Trade Bureau, Yokohama City Office ; all of Japan.

2152 A. B., Bhagalpur. Woollen yarns may be had of E. B. Bros & Co., 11, Dharamtala Street, Calcutta.

2154 S. C., Gwalior. Formula of lubricating oil appeared in June, 1923 issue.

2155 N. P. S., Hazaribagh. Wants to know the full address of the sole agent of elephant brand cigarettes. Desires to be put in touch with suppliers of fresh fruits, potatoes and groundnut.

2156 H. A. S., Bombay. Glass bangles may be supplied by S. Komai Glass Manufacturing Co.. 4, Chome, Minami, Honmachi, Higashi-ku, Osaka and Nishiumi Sakujiro Shoten, 49, Shichome, Minami-Ryuhoji-machi, Osaka ; both of Japan.

2157 B. J , Hoshangabad. Weaving accessories may be had of Ramanlal Chimanlal & Co., Kalupur Post, Ahmedabad ; Mukhuti Bros., 111 & 117, Upper Circular Road i Calcutta and Bros. Patner, 35, Ezra Street, Calcutta.

2159 S. C., Kaimganj. Addresses of foreign journals appeared several times in these columns.

2160 No name, Barduar. To dispose of lac and stag horn advertise in some newspapers.

Bombay Deshi Oushadhalaya.
Factory and Dispensary.
ASK FOR ANY FEVER
Ague Killer.
1 Phial As. 8. Doz. Rs. 5.
and our other pupular remedies. Can be had everywhere at Cheapest Rate.
PEARL & CO.,
Victoria Garden, Bombay.

2161 A. R. K., Gudikota. Digest the amalgam of gold and copper in strong boiling nitric acid when brownish obnoxious vapour will be given out; continue the operation until no further chemical action takes place. Pure gold will remain unaffected by the acid.

2162 C. M., Koranda. The best way to preserve milk for domestic purposes is to add to it every day a few grains of carbonate of soda per pint. Sprinkle borax pulverised in place where ants frequent. Mix some fine plaster of Paris with an equal quantity of flour; put the mixture in the place infested by rats and a vessel full of water beside it. The rats will devour the mixture, and then drink; thereupon the plaster, brought into contact with the water, will become solid, and like a stone in their stomachs, which will cause their death.

2167 M. B., Ahmedabad. Arrowroot is grown in Bengal, North-West Frontier Provinces and Oudh, Madras, Bombay and Burma.

2170 C. V. R., Rajahmundry. Can supply bonemeal.

2171 B W., Larkana. Tin foils may be had of Amitava Ghosh, 33, Canning Street, Calcutta. Card-board boxes may be had of H. L Sett & Sons, 8, Nilmoney Mitter Street; Kundu & Dass, 20, Gour Laha Street, and Calcutta Fine Art Cottage, 76, Dharmatala Street; all of Calcutta. Blocks are manufactured by Mahila Press, 29, Patadanga Lane, and Bharatvarsa Halftone Works, 201, Cornwallis Street; both of Calcutta.

2172 C. S. K., Colombo. For the required books enquire of Book Co., 4-4A, College Square and Thacker Spink & Co., 3, Esplanade; both of Calcutta.

2173 S. S. H., Pilibhit. Formula of rubber stamp ink will be found in July, 1923. Tallow may be had of Tallow Mart, 19, Tiretta Bazar Street, Calcutta. You may go through Bengal Nagpur Railway Magazine, published by Mr. A. P. Well, Garden Reach, Calcutta and Indian Railway Magazine, 335, Thambu Chetty Street, G. T. Madras.

2174 G. G. R., Masulipatam. Most probably the firms mentioned by you have no agency in India. However for further particulars you may write to India Agency Ltd., Hamburg, Germany. Alizarine dyes may be bought of Messrs Mohammad Alibboy & Co. 44, Armenian Street, Calcutta. British dyes may be had of John Catlow & Sons, 11, Clive Street, Calcutta.

2176 K. B. K., Bassein. Boil the decoction in the suitable quantity of simple syrup and bring down when a bit thick. Recipe of effective headache balm appeared in October 1921 issue. Deficient effect is perhaps due to the introduction of water for extracting essence. You may try to extract tinctures with the help of alcohol as water deteriorates the essential property to a certain extent. You may use Beaume's hydrometer of required grade for measuring the strength of soda lye. Hydrometer may be had of Bengal Scientific Supplies Co., 29, College Street Market and Bengal Chemical & Pharmaceutical Works Ltd., 15, College Square; both of Calcutta. As the articles you mention are of foreign origin their vernacular equivalents are not known.

2177 C. B. M., Sinor. Formula of depilatories appeared in June, 1924 issue.

2179 S. S. R. A., Karamandai. The book you require may be had of Messrs Thacker Spink & Co., 3, Esplanade East, Calcutta.

SETT DEY & CO
ORIGINAL HOMEO PHARMACISTS
42, Starnd Road, Calcutta.
Dealers in Original Homœopathic dilutions and Biochemic Triturations.
CATALOGUE FREE ON APPLICATION.

2182 A. E. O. M. H., Rangoon. Swedish Match Co. has already started factories in various places. For securing agency you should communicate direct. The Calcutta address is Panchavati Villa, Manicktala.

2186 A. R. D, Nadiad. Cameras may be had of Calcutta Camera House, Dharamtala Street, Calcutta.

2188 D. G. A, Amraoti. Knitting machines may be had of Economic Mills Ltd., 50-2, Dharamtala Street and H. Brady & Co., 26, Strand Road; both of Calcutta.

2189 C. L. T., Pilibhit. A dye is obtained from the roots and stems of berberis which is sometimes used in tanning and colouring leather. It would seem that the colour exists chiefly in the bark and in the young wood immediately below the bark. Berbery is perhaps one of the best yellow dyes in India, and the supply is inexhaustible. The seeds yield an oil. The principal use of the berbery is however in medicine. A watery extract is prepared from the stem and root called *Rusot* which is efficacious in the treatment of ophthalmia. The following are the addresses you require: Indian Industries and Power, Ballard Estate, Post Box 69 Fort, Bombay; Indian Medical Gazette, 3, Esplanade East; Indian Medical Record, 2, Horokumar Tagore Square, Corporation Street; Indian Railway Gazette, 11, Kyd Street, Calcutta and Industrial India, 55, Berneres Street, London. W. 1. British Indian Crafts. and Journal of Indian Industries and Labour have ceased publication. The Art of Soap Making may be had of Kamala Book Depot Ltd, 15, College Sq. Calcutta. Process of removing ink stain from cloths appeared in November 1921 issue. Formula of blue-black ink appeared in June 1923 issue. Other queries will be dealt with in an early issue.

Sadhana Ausadhalaya,
DACCA (BENGAL).
Adhyakha—Joges Chandra Ghose, M.A., F.C.S. (London.)
Absolutely Pure & Genuine Ayurvedic Medicines.
Makaradhwaja (Swarnasindur)—A specific for all diseases. Rs 4 per tola. **Chyavanapras**—The surest remedy for all lungs and chest complaints and general weakness. Rs. 3 p. seer. **Saribadyasab** 8 oz. phial 12 as. **Amritapras Ghrita**—Rs. 10 per seer. Catalogues free on request.

2190 J. G. R., Bombay. Your previous letter is not traceable, please repeat your queries.

2193 B. S, Kotaghat. Enquiries in the Trade Enquiry Columns are not generally repeated.

2195 R. N. D., Satna. Fruit essences may be had of K. C. Singh & Sons, 2-4, Ezra Street. Calcutta. Chemicals may be bought of B. K. Paul & Co., 1-3, Bonfield's Lane; Calcutta Chemical Co. Ltd., 35-1, Panditia Road, Ballygunge and Bengal Chemical & Pharmaceutical Works Ltd., 15, College Square; all of Calcutta: Picture framing requisites may be had of Fotic Lall Seal, Swallow Lane, Calcutta.

2196 M. J. A, Alleppey. You may write Messrs Gillânders Arbuthnot & Co., Gillander House, Clive Street, Calcutta.

2197 A. K. G., Morar. Wants to buy electro-homeopathic medicines.

2198 K. S, Jullundur. For books on watch repairing write to Chakraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

2199 R. M., Ghatkopar. For rules regarding New India Prize Competition see elsewhere in this issue.

2201 M. A. K., Vizianagram. An article on the manufacture of cigar and cigarettes appeared in September 1920 issue.

2202 L. A., Honda. Sodium carbonate will suffice for removing oil and grease.

2204 K. V., Chendragiri. For label printing write to the Imperial Litho & Tin Printing Works, 1-2, Machua Bazar Street, Calcutta. Can making machines may be supplied by E. W. Bliss Co, 12, Pocock Street, London S. E. 1. Mix the juice of 12 or more oranges with 12 fluid ounces of rectified spirit of 90 per cent. When the sediment has all settled to the bottom, draw the fluid off, filter it and bottle. For syrup please go through 'Syrup Manufacture' published from Industry Office. For toilet soap making you may go through Art of Soap Making to be had of Chakraberty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

2205 D. D., Khair. Process of removing ink stains will be found in August 1924 issue.

2208 S. S., Sambhal. Quicksilver may be had of B. K. Paul & Co, 1-3, Bonfield's Lane and Bengal Chemical & Pharmaceutical Works Ltd., 15, College Square; both of Calcutta.

2210 G. A., Valarpuram. Please go through New Idea Columns of INDUSTRY. For Taral Alta see last Aug. issue and for sachet powder see last September issue of INDUSTRY.

2211 M. N. R., Poondi. The Philatelic Society of India, 15, Burrows Street, Bombay and The Philatelic Journal of India, The Mall, Lahore may serve your purpose. For second-hand books enquire of S. C. Auddy & Co, Wellington Street, Calcutta. Formula of tooth powder will be found in June 1922 issue. Envelope making machines may be had of Oriental Machinery Supply Agency Ltd, 20-1, Lall Bazar Street, Calcutta.

2212 I. G. W., Firozabad. Wants to buy Japanese pots.

2213 M. A. M. H., Nagaram. We cannot help you unless you let us know the process of demonstration and your difficulty.

2214 T. M., Ahmedabad. In the true sense of the term rubber cannot be melted but it con only be vulcanized.

2216 N. V. K, Madras. An article on lithography will appear in an early issue.

2217 T. N. S, Calcutta Celluloid toys may be had of Frenchman Bros, 231 Hornby Road and H. Mapara & Co. P. O. Box 469 both of Bombay.

2219 S. B., Delhi. Is willing to exchange, buy and sell foreign stamps.

2220 A. C. S., Baripada. Anantamul and Kuchla may be had of Bansi Dhar Dutt, 126 Khungraputty, Calcutta.

2221 L. D. P., Almora. Formula of glass cement appeared in September 1922 issue.

2222 C. L. T, Pilibhit. You may write to The Chicago College of Homeopathy, 89, Shambazar Street and C. H. Medical College, 104 Cornwallis Street; both of Calcutta.

2223 S. A. G., Mhaborbuger. No other good books on match making is known.

2224 B. N. D. B., Cuttack. An article on the manufacture of calcium carbide appeared in September 1921 issue. Used stamps are occasionally sold at high prices. Ice making machine may be had of Burn & Co, 7, Hastings Street, Calcutta.

2225 A. S. A. C., Ludhiana. Your query appears elsewhere.

2226 P. C., Alwar. Packing boxes may be had of Calcutta Industrial Syndicate, 25, College Square, Calcutta and Ramchander Tatt, 10 Ram Krishnapur Ghat, Howrah Road, Howrah.

2227 G. D. M., Cawnpore. Wishes to know where lime stone is found in U. P.

2230 J. S. Q., Nova Goa. Portland cement of required brand may be supplied by The Associated Portland Cement Manufacturers Ltd., Portland House, Lloyds Avenue, London E. C. 3. For China crakers write to The Orient Fire Works, 85-1 Upper Circular Road, Calcutta. Matches are manufactured by Samuel Wittenberg, Sillein, Zilina and Gran & Spol, II Jungmannova, 17, Prag; both of Czechoslovakia.

2231 S. S., Parasia. Both sulphur and saltpetre may be had of Akhoy Kumar Dutt & Sons, 2 Banstala Street, Barabazar and Surendra Nath Daw & Son, 2 Dayehatta Street, Barabazar; both of Calcutta. Can buy charcoal.

2232 S. R. S. K., Jodhpur. Caustic soda of required strength may be had of Calcutta Chemical Co. Ltd., Panditia Road, Ballygunge, Calcutta.

2233 V. D. W., Ubbanda. You may write to the Calcutta Pottery Works Ltd, 45, Tangra Rd, Calcutta.

2234 J. C. P., Goa. You may go through Art of Soap Making by Mr. A. Watt to be had of Chakraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

2235 S. V. G. J., Jawalapur. Your enquiry is outside the scope of INDUSTRY.

2236 G. L. L. N. L., Gorakhpur. The article you refer will be found in April 1923 issue.

2237 S. W. G. C., Karachi. Tea may be bought of Barry & Co., Lyons Range ; Bhattacherya & Co., Ltd., 64-1 Cornwallis Street & Dayson Darjeeling Tea Co., 97, Clive Street ; all of Calcutta. For insurance write to Gillanders Arbuthnot & Co, 8, Clive Street, and British India General Insurance Co., Ltd., Mission Row ; both of Calcutta.

2238 B. S., Kolaghat. You may go through January 1923, and August 1922 issues which deal with the strength of soda lye.

2239 M. T. F., Lucknow. Soap making outfits may be had of Calcutta Industries Ltd, 71, Canning Street, Calcutta.

2240 S. P. M., Ahmednagar. Plush, Imitation Sealskin, Poplin, etc. are made from Silk Waste. Silk waste is spun in different ways. The portion which cannot be utilised as above is of value as a manure, containing as it does about 14 per cent of nitrogen, and being finely divided. The flocks and unspinnable waste may be spun into round hemp cords, and plaiting the cords, etc.

2242 J. M. T., Kankanady. For German worm seed enquire of S. N. De, M.Sc. P. O. Box 7851, Calcutta. You may go through L'Exportateur Francaise Paris, France.

2244 J. D. M., Muttra. Ubersee Post, 10, Solomonstrasse, Leipzig, Germany has got wide circulation in Germany and France.

2245 M. S. M, Srinagar. You better consult Thacker's Directory where you will find everything you require.

2248 E. J. C., Multan. Beeswax may be had of N. Lyngdoh, Barabazar Shillong, Assam. Gum may be had of Bansidhar Dutt, 126, Khangraputty, Barabazar, Calcutta. Myrobalans may be bought of A Razak Khan, Jubbulpore. Wishes to be put in touch with dealers in rice and black and green grams of Rangoon and Akyab ; Moradabad ware dealers of Moradabad and coconut oil and fresh and dry coconuts and cardamom and other spice dealers of Ceylon, Singapore and Cochin.

2250 A. P. R. B. P., Sivakasi. Match splints and veneers may be bought of Bhowani Engineering and Trading Co, 122-1, Upper Circular Road, Calcutta. Frame filling machine may be bought of Bengal Small Industries Co., 91, Durga Charan Mitter Street, Calcutta. Chemicals may be supplied by Calcutta Chemical Co., Ltd, Panditia Road, Ballygunge, Calcutta.

2251 G. H. M., Calcutta. Wants to be put in touch with dealers in Indian Cocculers, commonly known as cochineal insect. Will any of our readers enlighten him as regards what *glawdin* is.

2253 F. D. Co., Multan. Your enquiry being in the nature of an advertisement should not go in the Trade Enquiry Column of INDUSTRY.

2254 L. B., Ranchi. Have your machine patented ; then none can infringe upon your right. For information enquire of Messrs. P. Lodge & Co, Patent Agents, Post Box, 6772 Calcutta.

2255 I. D. Co., Rangoon. For methods of preparing pipe tobacco you are referred to the September 1920 issue of INDUSTRY, in which an article on the subject appeared.

2256 K. M. S., Sambalpur. You may consult the following books : Soap-Making by A. Watt ; Manufacture of Hair Oils published by Industry Office, Heiko attached to names of essences means that these essences are manufactured by Heiko Heine & Co., of Germany. The addresses of match manufacturers follow : Amrit Match Factory, Bilaspur, Kota ; National Match Factory, Canal East Road, Ultadanga, Calcutta ; Guha's Lucifer Works, 23-J, Paikpara Raja Manindra Rd., Calcutta ; Bengal Match Factory and Saw Mills, Ltd, 285-10, Bowbazar Street, Calcutta ; Zeo Match Factory, Rajgangpur, Chaibassa.

2259 C. V. R. R. B , Masulipatam. For chemicals write to The Bengal Chemical and Pharmaceutical Works, 15, College Square, Calcutta. You may also refer your enquiries to Calcutta Chemical Co, Ltd., Panditia Road, Ballygunge and Messrs. B. K. Paul & Co., Bonfield's Lane ; both of Calcutta.

2260 G. R. A., Khandwa. To learn tailoring you may get yourself admitted in Kamalaya, College Street, Market, Calcutta or in Calcutta Commercial Institute, College Street Market, Top Flat, Calcutta. No hosiery firm as you mention is known to us. Wants names and addresses of Homeopathic journals. For list of stationers consult directories or advertisement pages of INDUSTRY. For flour mills and oil machines enquire of Messrs. Burn & Co , 7, Hastings Street, Calcutta. Desires to be introduced to dealers in simul cotton.

2261 P. C.. Rajgarh. For printing machines, etc write to Messrs Ashutosh Auddy, 16 Lower Chitpur Rd, Calcutta. For types communicate with Cama Nortons & Co, Homji Street ; Kika Bhai Harivalabdas & Son, Kalbadevi Road ; both of Bombay.

2262 H. K. P., Madras. No such automobile firm is known.

2263 W. H. J., Nugegoda. For fibre making machines write to Ernest Lehmann, 8, Chattam Blds., Chattam Street, Manchester.

2265 M. S., Chittagong. Wants to buy chaulmogra seeds in large quantities. You may however enquire of Poothicote Bros & Co., Alleppey, Travancore, S. I. Eucalyptus oil has great medicinal properties and even antiseptic elements.

2266 S. N. S., Sylhet. You have to send your boy to work as an apprentice in the factories. There is no institution in India where instructions on these subjects are imparted. Carraway seed is known in Bengali as *jira*. Sabar is a kind of perennial grass plentiful in drier tracts of India and is known in vernacular as babois, bhabar, bhail, som, moya.

2267 P. Bros., Vartej. Tar products in England may be had of James Greenshields & Co. Ltd., 54, Gordon Street, Glasgow, Scotland.

2271 J. R. D. E., Hafizabad. Write to the party by number and initials under care of INDUSTRY when your letter will be duly redirected.

2272 C. H., Hyderabad. See above. Refer to No. 2271.

2273 K. P. V., Buxar. For lace manufacturing machines write to The Oriental Machinery Supply Agency, Ltd., 20 1, Lal Bazar Street, Calcutta. For particulars and details write to the same party.

2274 R. G., Hyderabad. The following are the addresses of picture post card manufacturers of France and Germany : P. Racine & Cie, Boul Sebastopol, 96, Paris ; P. J. Gallais & Cie, Rue Vignon, 38, Paris ; Photochemic, G. m. b. H., N. stolpischestrasse, 37, Berlin ; Novitas Verlag, 6, Kellner, Pitterstrasse 77-78, S. W., Berline. Formula of washing soap appeared in the May 1924 and October 1923 issues of INDUSTRY.

2275 R. N , Lucknow. Hair depilatory soaps are injurious to the skin.

2277 B. S. R., Nagpur. Lenses may be had of Adair Dutt & Co., 22, Canning Street, Calcutta ; also enquire of Bengal Scientific Apparatus Supply Co., 62, Bowbazar Street, Calcutta.

2278 Roll No. 13149, Bhim. For pictures write to Roy Babajee & Co., 182, Lower Chitpur Road, Calcutta ; Bombay Fine Art Gallery, 69 Esplanade Road, Bombay.

New Prizes for Vol. XV.

The Editor of INDUSTRY invites its subscribers to compete for the following prizes offered for the ensuing session.

I. New Ideas for Small Capitalists.

We offer 5 Prizes of Rs. 5 each for ideas which can be successfully adopted by a young man with capital up to Rs. 500 only in his pocket to earn a decent livelihood. Schemes for starting small industries will be welcome but stress will be laid on their practical adaptability which will influence decision.

II. Suggestions for Self-Supporting Students.

We offer 5 Prizes of Rs. 5 each for suggestions which can be easily carried out by students who follow the principle of earning while learning and which must enable them to defray their expenses at least. The practical nature of the suggestions will be taken into consideration in awarding the Prizes.

III. Occupation for Purdahnasin Ladies.

We offer 5 Prizes of Rs. 5 each for details of useful domestic industries which can be worked by the female members of a family in their spare hours. Special opportunities may be pointed out how a helpless widow can earn a decent living for herself.

IV. Village Manufactures.

We offer 5 Prizes of Rs. 5 each for descriptive notes on the industries of the readers' villages. The narrative should give synopsis of the existing arts and crafts, their past history, present condition, future prospect, raw materials used, working processes, market for products, etc. It should be accompanied by a complete list of names and addresses of persons engaged.

Rules for Competition.

1. Only subscribers to INDUSTRY are eligible for the Prizes.

2. The Editor's decision will be final and he will be at liberty to publish any communication in any way he likes. The names of successful candidates will be published in the first issue of the next volume.

3. The Editor will not be responsible for loss of or damage to any correspondence, neither will he remain bound to return any Manuscripts.

4. The Editor cannot enter into any controversy regarding unused or rejected Manuscripts. But in case requisite stamps are enclosed every endeavour will be made to send them back.

5. The Ideas, Suggestions and Articles for the separate sections noted above must be written on one side only on separate sheets of paper and addressed to—

THE COMPETITION EDITOR,
"INDUSTRY"
Shambazar, Calcutta.

Note.

The name of the writer of the article on Picture Frame Moulding in the August issue should be Mr. S. R. Naik, Asso. C. A. S. E. (London) and not P. R. Naik.

From time to time newly started magazines, journals and newspapers in the vernacular languages are sent to us for review

While it is extremely gracious on the part of the inaugurators to consult our opinion we express our inability to do adequate justice to all. Nevertheless we wish them godspeed in their noble endeavours for the spread of news and dissemination of knowledege.

Notices & Reviews.

Ganitadwaita.

By Lokabandhu Carcherla Srinivasa Rao, Jagannaikpur, Cocanada. Published by M. B. L. Varma's Industrial Bureau, Cocanada, Price As. 8. This pamphlet is a free translation of the Telugu Booklet of the same name. By this science of Ganitadwaita the Adwaita Philosophy is established without trouble.

Booklets.

"How to get an Income" published by Mr. R. Seshan B. A. (U.S.A.) Srirangam Post, Trichinopoly, S. I. As. 8. It contains some recipes and and formulas for preparing common articles.

The Advertiser.

An anglo-vernacular monthly magazine of trade and publicity published by Messrs. Jadeva Bros., Baroda. Annual Subscription Rs. 2.

Advertising India.

A fortnightly journal dealing with advertising, salesmanship, commerce, economics, etc and published by the Universal Publicity Syndicate, 17, Godown St. Madras E.

Snake-Bite Cure.

It is gratifying to learn that the "antivenom inhalation" of Mr. P. Banerjee, Great Bengal Pharmacy, Mihijam, E. I. Ry has met with unique success. Indeed judging from the spontaneous testimony as to its efficacy from the general public the snake-bite cure has removed a long-felt desideratum. The loss of persons and cattle due to snake bites is one of the curses of tropical life and any remedy which claims to afford immunity to the patients from the mortal poison ought to be given a fair and impartial trial.

Calendar.

Messrs Jaideva Bros. of Baroda have sent us their "Advertising Calendar."

"Keshline".

The Keshline hair oil of Messrs B. C. Sirkar & Co, 9-1, Bahir Mirjapur Road, Calcutta being of superior quality cannot fail to give satisfaction to the users.

Hair Oil.

We are extremely satisfied with the hair oils of Mr. H. C. Patel, Near Parsi Agiary, Neemuch, C. I. who has sent us a phial of rose hair oil accompanied by samples of vetivert, boquet, medicated and scented hair oils.

Swadeshi Laces.

Beautiful laces of imitation Pypin are manufactured on country made machines by the Standard Taussar Works of Messrs Hiralal Modi & Co., Sanghadiawad, Surat. There is a wide assortment to choose from : narrow and broad : plain and coloured ; embroidered with silver and gold threads (jaris) etc, suitable for borders of saries, fringes of frocks and the like. The finish of the laces are attractive and their appearance brilliant ; their quality is high while the prices are low.

FIRST & GOLDEN REMEDY
For various Bodily Ailments.

Arvind-Nilgiri Eucalyptus Oil.

(Guaranteed Absolutely Pure Eucalyptus Oil).

We have manufactured this Arvind Eucalyptus Oil in our own Factory at Coonoor—the Nilgiri Hills—under expert supervision.

Used for Plague, Cholera, Malaria, Influenza, Rheumatism. Cuts, Sprains, Burns, Scorpion Bites etc. etc.

One lb. bottle Rs. 1-12, one oz bottle As. 4. Discount on Big orders. Postage and packing extra.

LOKMANYA AGENCY, Bombay Branch
Bombay 4.

Pain Balm.

We are in receipt of a sample phial of Universal Pain Balm from Universal Goods Trading & Mfg. Co., Baran, Kotah.

A Talisman.

We have received from Mr. Balmukund Thakor of Bundi a Kavacha (or Talisman) prepared according to Shastric injunctions with Ram Mahamantra engraved in Sanskrit on a small piece of glass.

Card Calendars.

Messrs S. B. S. Mehta & Sons, Mandi, Rohtak, Punjab manufacturers of thread balls and thread balling machines have sent us a couple of card calendars.

Blotting Pad.

We are in receipt of a serviceable blotting pad from the insurance department of Messrs Chimanlal Khimjee & & Co , Post Box 32, Hubli.

Toilets and Hill Products.

Amrit Prova, a pocket doctor, i.e., a universal remedy ; Swaroop Ras Gandh for marking the forehead, etc. may be had of Krishna Works, G B. Shivpuri, P. O, Gwalior, C. I. wherefrom also a supply of forest products of Vindhya Hills may be obtained such as pure catechu.

December Issue of Industry.

(In the Press.)

The December issue of INDUSTRY will be a Special Number dealing primarily in Textile Industry in its various aspects such as spinning, weaving, dyeing etc and thus will be a complement to the special cotton number (July 1924). Besides it will contain technical articles in addition to Formulas, Small Trades, New Ideas and other useful features. Any friend of our subscribers may get a copy free as sample on application to Manager, Industry, Shambazar Calcutta.

Trade Enquiries.

[Letters to the parties are to be addressed by number and initials under care of INDUSTRY when these will be duly redirected]

2269 S. B. L. S., Muttra. Wants to know the addresses of the manufacturer of micro photos. Will any reader of INDUSTRY supply him the address ?

2373 G. F. M , Goa. Will any reader of INDUSTRY communicate to him the address of manufacturers of reels of thread in Germany or U. S. A. ?

2381 R. T. M., Calcutta. Will any reader of this Journal give the addresses of all the local shop-keepers in Assam on commission basis ?

2425 S. K. S., Calcutta. Desires to purchase plain white blankets for making printed *Aran*.

2426 S. N. T., Lucknow. Wishes to be put in touch with dealers in raw swine hair.

2467 M. B. M., Balaghat. Can supply manganese ore.

2471 M. S. K. R., Bezwada. Wants a capitalist willing to do banking business with 5 lakhs of rupees in a paddy growing locality, 12 per cent returns expected.

2501 M. A. G. K. A. S , Furrukabad. Wants to be put in touch with onion, betelnut and catechu merchants of Bombay and Calcutta.

2520 C , Aijal. Can supply raw cane.

2593 G. T. M. C., Baran. Wants to be put in touch with manufacturers of both crude creosote and carbolic acids and printing press materials.

2606 V. P. C , Bombay. Wants to be introduced to wooden stationery article manufacturers of Delhi.

INDUSTRY.

Is a monthly Journal of Technology and Handicrafts, Science and Commerce, Agriculture and Business The rate of subscription is as follows:—

Indian Rs. 3 Foreign Rs. 5-4.

The charge is for complete yearly volume only, inclusive of postage.

Single Copy As 5 only.

Maneger, INDUSTRY OFFICE,
Shambazar, Calcutta.

Managing Editor—MR. [illegible] BANERJEE.

INDUSTRY
A Journal of Technology Handicrafts & Commerce

Vol. XV. CALCUTTA, DECEMBER, 1924. No. 177

Promote Cloth Industry.

IN THE struggle for economic freedom of India it will be our primary duty to gain control over the fundamental industries of this country. And the textile industry is the most important basic industry inasmuch as cloth is the fabric of civilisation. We may take glory in the fact that India once clothed the whole world and, in a way therefore she helped the growth of human civilisation. Nevertheless through vicissitudes of fortune we have latterly become dependent for our textile requirements on foreign countries, chiefly Lancashire, England. Now that we have realized our past greatness and visualized our future prospect it behoves us to be self-sufficient in regard to our necessities. And this for more than one reason. We import annually about 60 crores of rupees worth of foreign piece goods. By undertaking to manufacture our own clothing we can put a stop to this exhausting economic drain on India's slender resources.

Again, the successful establishment of cotton textile industry will create a steady demand for the fibre thereby benefitting the cotton growers directly and other cultivators indirectly. This industry, therefore, large as it is by itself, will afford employment for millions of our countrymen. A number of subsidiary and allied industries will also crop up around this industry which will incidentally lend an impetus to other industrial enterprises as well. All these will help to solve the unemployment problem and conduce to the increase of national wealth.

Practically speaking, Bombay now supplies the rest of India with Indian piece-goods. But the other provinces may conveniently follow suit by starting the cotton-mill industry within their boundaries. Obviously, however, a great portion of the textile production will be carried on as a cottage industry. The female spinners on simple *charka* as well as the male weavers on hand-looms will thus be provided with means of livelihood. The idle labour of the villages will find lucrative occupation and the agriculturists could easily add to their income.

Aside from these pecuniary considerations we ought to feel shame in wearing foreign apparel. We must produce the clothes we need ourselves. Be they ever so coarse, be they ever so dear, we must use country-made textiles; for in that way we will make our countrymen industrious and our motherland prosperous.

INDIA'S INDUSTRIAL PROGRESS.

Wood Distillation in Mysore.

In connection with the Mysore Iron Scheme, a wood distillation plant, the only one of its kind in India, has been set up and is now in full working order. The furnace of the Iron Scheme is heated with charcoal, and this necessitates the supply of large quantities of timber. It is claimed that, being made with charcoal, the pig iron is the best produced in India. But it is naturally very expensive and unless something is done to distil the by-products of the wood, the scheme could not possibly pay. With a view to obtaining these by-products, alcohol, etc., the distillation plant has been erected.

Chinsurah Agricultural School.

The abolition of the Government Agricultural School at Chinsurah on the Hooghly under the garb of retrenchment is extremely ill-advised inasmuch as agriculture is the main occupation of the people of Bengal in common with other parts of India. With a view to train our youngmen in scientific and up-to-date methods of agriculture and incidentally to solve the unemployment problem amongst the middle classes, the organisers of the Calcutta Technological College have taken the responsibilities of running the above Institution. The promoters of the project, therefore, not only deserve the thanks of the public but also their active support. The Government of Bengal have been pleased to lease out to them at a nominal rent the school buildings with furniture, museum, library, agricultural tools and implements as well as 130 bighas of land adjoining the building. Besides practical tilling of the soil the industrial and commercial side of agriculture will be emphasised upon. Further it is proposed to impart along with scientific agricultural training practical knowledge in allied cottage industries.

The authorities are now glad to be able to announce that every arrangement has been made for starting the new session of the above school under the new management. An experienced agricultural graduate of a well-known American University has been appointed wholetime resident Teacher and a batch of eminently qualified agricultural chemists and engineers has been selected for imparting both theoretical and practical instructions to the students.

As lectures will be given in Bengali any one with a fair knowledge of Bengali and English will be admitted. Only those who are not afraid of hard labour will be selected. The students will be required to be self-supporting after a period of six months. Each of them will be allotted a few plots of land measuring in all about 2 bighas or so and he will have to meet all his expenses of education from the products of his plots. Of course in this matter he will get all possible help from his teachers who will explain to him the scientific methods of treating his soil after the way in America and Japan.

Further particulars will be available from The Secretary, The Calcutta Technological College, 201, Lal Bazar St., Calcutta.

COTTON TEXTILE INDUSTRY.

Introduction.

The inventive faculty, the perception of beauty and the high intellectuality of the Indian people are no where better illustrated than in the manufacture of the various kinds of textile fabrics for which India has been justly famous from pre-historic times. In tracing the growth of cotton manufacture Sir George Birdwood writes with appreciation :—"At a date before history the art was carried from India to Assyria and Egypt ; but it was not until the thirteenth century that the cotton plant was introduced into Southern Europe where its wool was at first used to make paper. The manufacture of it into cloth in imitation of the fabrics of Egypt and India was first attempted by the Italian States in the thirteenth century ; from which it was carried into the Low Countries and thence passed over to England in the seventeenth century." Failing however, to compete with India on fair free trade principles, the English had to seek the assistance of legislation prohibiting the use of chintzes and calicoes. But it proved of little or no avail against the prodigious importation and tempting cheapness of Indian piece-goods at that time. Fustians, etc. were first made in London and in Manchester in 1641. Cotton was first manufactured in Scotland in 1676, and in Glasgow in 1738. After the invention of Arkwrights' machine in 1769 the production of Manchester developed very rapidly. The industry obtained a real footing in Europe in the 18th century.

The great export trade in Indian cotton manufactures naturally fell before the competition of Manchester. Still, however, an immense cotton manufacture, for domestic purposes, continues to exist in this country as we have shown in INDUSTRY for October 1922 under "Home-made Textiles" to which we refer our readers as a prelude to the present survey and as will be seen from a description of the textile industry of India noted below.

India is justly regarded as the home of the cotton industry. Handweaving has from time immemorial been constantly practised in almost every village.

Among the cotton manufacturers of India, the fabrics known as the Dacca muslins were held in high repute from very ancient times, and when the Roman Empire was at the zenith of its power large quantities of it were annually exported to Western Europe by way of Egypt and Asia Minor. Later on, the manufactures received a great impetus on account of the high demand for it in the harem of the Kaliphs of Bagdad.

The muslins of the finest kinds were known by the name of "Abrawan" or the Running Water and Shabnam or the "Evening dew." They were of such a delicate texture, that as their name implies, they could not be distinguished from pure water when wet.

In delicacy of texture, in fineness of web, the Dacca muslins have not as yet been surpassed by the highest qualities of the machine-made manufacture of Europe.

Similarly the chintzes of Masulipatam have also enjoyed a world-wide celebrity ever since the days of Arrian, and probably of the Mahabharata.

COTTON MILLS IN BOMBAY.

The first cotton mill was opened in Bombay in 1857, and sixty years later there were approximately eighty in that city, and a very larger number in other parts of the Presidency. The spinning and weaving of cotton by steam machinery has now become an important industry in that Province, a development favoured by the proximity of the supply of raw material.

For many years the mills produced mainly yarns, chiefly of coarse counts, to meet the demand of Indian handweavers and of the China market; but of late years many weaving-sheds have been erected. The best mills can now produce fine cloth manufactured from imported high count yarns, and coloured as well as fancy goods of superior description.

Most of the mills are found in Bombay City and Island, where the moist atmosphere favours the processes of spinning and weaving. Outside Bombay, the city of Ahmedabad is the only centre of importance. The chief articles manufactured are yarns of counts up to 42's, dhotis, shirtings, *chaddars*, T cloths, sheetings, coloured and fancy goods. A large local demand exists for the product of the mills; and there is also an export trade of considerable value. The mills in Bombay draw large numbers of labourers from the Konkan District of Kolaba and Ratnagiri, and from Satara, Poona, and Ahmednagar in the Deccan. These for the most part return to their homes at intervals for such agricultural operations as their continued connection with the land required. They earn good wages.

There is an excellent trade locally for the output of the mills, but the value of the annual exports have risen to a very considerable amount.

Both yarn and cloth are dyed, the favourite colours being red, blue, green, and yellow, but two or more of these are frequently blended with pleasing effects.

Some of the most skilful weavers in India are found in the districts of Ahmedabad and Surat.

Cotton Manufacture.

Cotton manufacturing, in its broadest sense, may be defined as the sum of the processes necessary to transform cotton into yarn and cloth. In the first stage cotton fibre is converted into yarn by the process of "spinning" and in the second stage the yarns are manufactured into textiles by the process of "weaving."

Cotton spinning is one of the great industries of the world, and out of a purely manual operation it has developed into an almost perfect automatic method of production by mechanical means.

When cotton has arrived at the mill, the processes through which it must pass before being turned out as finished cloth are varied and more or less intricate. The most important step in the process of producing cloth from the raw materials is the spinning. This may be variously divided, each division embracing a group of separate manipulations. In some mills the process stops with the production of the yarn, while in others it goes to the loom and after various manipulations becomes the finished product.

In all the processes the manipulations are rather complicated. Many different kinds of machines are employed, some of them of great complexity, yet so skilled do the operatives become that a single person can readily attend to the almost automatic workings of a number of the most intricate spinning mules. Just as the bale is generally considered the unit of the cotton crop, so the number of spindles and looms is taken to indicate the relative capacity of the mills manufacturing it.

Cotton spinning embraces all the processes and operations necessary to produce cotton yarn from raw cotton. These operations may be divided into the following four stages :—

(1) Preparatory processes. (2) Roving. (3) Fine spinning. (4) Finishing.

(1). PREPARATORY PROCESSES.

The objects of the preparatory treatment of cotton are manifold :—

(1). Accurate admixture of the different kinds of cotton to be treated.

(2) Cleaning the cotton and thoroughly separating the individual fibres.

(3) Eliminating dust and other adherent impurities.

(4) Sifting out excessively short fibres.

(5) Arranging the individual fibres regularly and securing uniform distribution.

Accordingly the following operations have to be performed.

(1) Mixing, (2) Opening and cleaning, (3) Carding, (4) Combing, (5) Doubling and drawing.

(2) ROVING.

As a rule the treatment of sliver in the drawing frame is not performed with a view to obtaining a very high degree of attenuation, this task being left to the roving frame, several of which are generally used in succession.

Cotton roving frames are machines in which the doubled and attenuated sliver is increased in fineness by further drawing, and by being turned around its own axis receives a twist, imparting sufficient strength to enable it to bear the strain of gradually increasing attenuation and of winding on a bobbin, withount breaking. The three main working parts of the roving frame are :—

(1) The drawing mechanism.

(2) The twisting mechanism.

(3) The winding mechanism.

(3) FINE SPINNING.

In the process of fine spinning, the loose, coarse, slack-twisted rove is converted into solid, fine, and more or less tightly-twisted yarn, forming the finished product, by the aid of spinning frames, which draw the rove out to the requisite degree, and at the same time impart the necessary twist. The extent of the twist depends on, (a) the fineness of the rove, (b) the "number" of the yarn to be produced, (c) the length of staple, (d) the draft produced by the drawing rollers, (e) the purpose for which the yarn is intended.

Two main varieties of fine spinning frames are used in the cotton industry, viz :—

(1) Throstle or water frames, (2) Mule frames.

(4) FINISHING.

This process comprises all the operations to which the yarn has to be subjected after it has been spun. Some of these operations have no modifying influence on the yarn, and are carried out for the sole purpose of classifying the product according to various standards, reeling, numbering and testing it for quality and suitability ; whilst others have for their object the production of novel and more effective combinations, e.g. making twists or fancy yarns from singles ; others again are for finishing, preserving and improving the yarn ; and finally comes the task of packing for transport.

FINAL PROCESS OF SPINNING.

The final process of spinning is by drawing out the "sliver" to the required length or fineness of the yarn, and it is also twisted or "spun" to give it the necessary strength of cohesion. There are two different types of machine in use, the "mule" and the "ring" frame spindle.

Mule Spinning.—The mule spindle is so called because it is cross between Hargreave's spinning jenny and Arkwright's roller-frame. When this type of machine is used the processes of drawing, twisting and winding are done separately. The "rovings," i.e., "the slivers" as they come from the roving machine, are first passed through a series of small rollers set in pairs, each pair being driven at a higher speed than those preceding it, and thus the thread is drawn to the one set of rollers faster than it can leave the previous set, and, as a result, is drawn out still further. As it leaves the last set of rollers it is carried to a small "cop" or bobbin which revolves on a spindle. These spindles are set on a movable carriage which is drawn backwards, thus giving the yarn its final drawing to the necessary length. The carriage then stops and the spindle spins round rapidly and so twists the portion of thread in the intervening space. This done, the carriage runs back to the frame, winding up the spun yarn on the bobbin as it goes.

Ring Spinning.—In the ring frame these three processes of drawing, spinning, and winding are done simultaneously, thus saving time and greatly increasing the output per hour. The mule is still used for fine yarn, as the ring spinning machine, though faster and therefore cheaper, does not give such good result. The average output of yarn from a ring spindle is about twice that of a mule spindle.

Ring spinning is practically the only system of continuous spinning used in the cotton industry. Its chief feature consists in the substitution for the flyer, or the cap, of a smooth annularring formed with a flange at the upper edge, over which a light C-shaped piece of wire, called a traveller, is sprung. The rings are secured in a rail that rises quickly and falls slowly, but at each succeeding ascent and descent it attains a higher point than that previously reached. A spindle is supported by, and turns in a bolster secured to a fixed rail.

A recess in the bolster is filled with oil to automatically lubricate the bearing. A spindle is placed in the centre of each ring ; it has a sleeve fitted upon it which carries a wharve that covers the upper part of the bolster, and a band from a pair of drums is drawn round the wharve to drive the spindle. After passing the drawing rollers the roving is twisted, hooked into the traveller, and made fast to a spool placed upon the spindle. As spinning proceeds the traveller is pulled round the ring by the thread ; it thus puts a drag upon, and holds the thread at the winding point.

INTERMITTENT SPINNING.

The essential difference between continuous and intermittent spinning is that the former draws and twists consecutively, whilst the latter draws and twists, simultaneously. In the Mule a creel, fixed at the back of the machine, is designed to hold the rovings in three or four tiers, from whence they pass between three lines of drawing rollers and two faller wires. They are next led to spindles mounted in a carriage whose wheels run upon rails called slips. As the rollers feed the partially attenuated rovings the carriage recedes from the rollers a little faster than the rovings are delivered, thus completing the attenuation. Meanwhile the spindles are revolved rapidly by bands passing from a tinned cylinder and the threads are twisted. This twist goes first to the thin places where least resistance is offered to it, leaving thick places almost untwisted ; the pull of the carriage, therefore causes the fibres to sleep most readily where there are fewest twists, and gives to a thread an approximation to uniformity in diameter. On the termination of a stretch the carriage stops, the twisting is completed, the spindles reverse the direction of their rotation to back off, or remove the yarn which is coiled round the spindles above the winding point, and whilst one faller wire operating on all the threads at once decends to the winding position of each spindle, the other rises to take up the yarn delivered by the spindles. This completed, the carriage returns to the roller beam, and in doing so the spindles revolve in their normal direction to wind the stretch of yarn spun in the outward journey. All the foregoing movements are regulated to succeed each other in their proper order, the termination of one operation being the initiation of the next.

For many purposes the threads as spun by the ring frame or the mule are ready for the manufacturer; but where extra strength or smoothness is required and where multicoloured effects are needed, two or more single threads are compounded and twisted together. This operation is known as doubling. In order to prepare threads for doublings it may be necessary to wind side by side upon a flanged bobbin, or upon a straight or a tapering spool, from two to six threads before twisting them into one.

Winding machines for this purpose are of various kinds. There are those in which the threads are laid evenly between the flanges of a bobbin, and those that coil the threads upon a straight or a tapering tube to form "cheeses."

Spinning Operation.

The manipulation, mechanical and otherwise that cotton undergoes in being converted into yarn, from the state in which it is delivered to the mill, may be out lined as follows ·

Mixing—Is the blending of different varieties of raw cotton, in order to secure economical production, uniform quality and colour, and an even thread, in any desired degree. Mixing is, in a measure, imperatively necessary, in order to neutralize the irregularities of growth, and imperfect classification, found more or less in all cottons.

2. Opening—In consequence of the heavy pressure to which cotton is subjected in packing the fibres become strongly matted together; the opening process is to loosen them, and to remove a portion of the foreign substances present.

3. Scutching—Has a two-fold object: viz. the further extraction of impurities and the formation of a "lap" which is a web or sheet of cotton formed in the machine, and wound upon a small roller. In this web, the fibres lie in all directions.

4. Carding—The foregoing processes have dealt with the cotton in bulk. In carding, the operation of opening is continued, but the material is treated in its individual fibres, which are taken from the lap, further cleansed, and laid in a position approximately parallel to each other, forming a thin film, which is afterwards condensed into a "sliver"—a round, soft, and untwisted strand of cotton.

5. Combing—Is used for the production of fine yarns, or those of very high quality. Its object is to obtain uniformity in the length of the fibres undergoing preparation; to accomplish this, all those shorter than the required standard are combed away, and rejected.

6 Drawing—In this operation, several slivers, the product of the carding process, are combined, and attenuated to the dimensions of one of the component parts; the objects are to render the new sliver more uniform in thickness, and to place the fibres more perfectly in parallel order.

7. Slubbing—Is a process by which a further combination of the slivers is effected, and the objects of drawing are more perfectly accomplished. The drawing or attenuation of the strand is now carried so far that it becomes necessary to twist it slightly,

in order to preserve its cohesion, and rounded form.

8. Roving—This is a continuation of the preceding, its principal object being to still further attenuate the sliver. At this point, also, the latter receives additional twist, to enable it to bear the slight strain necessary to draw it from the "spool", without the formaof uneven places.

9. Spinning—The concluding process of the series. The sliver is here attenuated to the required fineness, and is given the twist by which the thread is completely formed.

10. Doubling—In this series, may be included the process of doubling, it being much more akin hereto than to manufacturing. It is a large and increasing business, often carried on in conjunction with spinning but frequently found quite apart. It is a method of combining two or more threads to form a single cord ; and is adopted in the production of many varieties of yarn, which are used for widely different purposes.

11. Gassing is the passing of the thread rapidly through a flame so as to singe off the loose nap from the yarn. The yarn is now finally wound into a number of different forms according to the way in which it is to be used. On bobbins for warping or into hanks or bundles.

12. Yarn Finishing.—If the yarn is not to be used in the "grey" that is to say, in its natural state and colour, it is finished by bleaching, dyeing, mercerising etc.

Weaving Operations.

The subsequent progress of the yarn through the entire routine of manufacture into cloth essentially comprises a series of eight operations, performed in stages as described below : —

1. Reeling yarn into hanks.
2. Winding yarn on to warpers' bobbins.
3. Warping.
4. Sizing.
5. Beaming—i. e., winding warps finally on to weaver's beams.
6. Looming. There are three optional methods viz , Drawing-in, Twisting and Tying—to pass the warp threads through the shedding harness and reed.
7. Gaiting or tuning—i. e , preparing the warp, shedding harness, and the loom ready for weaving.
8. Weaving.

Of these eight operations, the first five and the last (weaving) are performed mechanically. The sixth (looming) is generally accomplished by hand, although both drawing-in and twisting (or else tying) are sometimes performed by automatic mechanical appliances. The seventh operation comprises numerous incidental functions requiring personal labour and skill.

The foregoing operations are briefly summarised below.

1. REELING.

This operation consists of transferring separate threads from any of their previous forms, and converting them into hanks or skeins of specific lengths. The object is to place the respective threads in a free, open, and loose state, and thereby adapting them more suitably for incidental processes, such, for example, as mercerizing, bleaching, dyeing, lustring, polishing, or glazing, etc.

2. WINDING.

This operation is usually the first in the series of preliminary operations conducted in a weaving mill, where yarn is received either in its primary forms or in hanks. It consists essentially of transferring separate threads from any of their previous forms and winding them either on to flanged warpers' bobbins or else spools, according to the type of winding machine employed. There are three distinct types of this machine with various modifications :—

1. What are technically known as "cop," "bobbin," and "upright" or "vertical" spindle winding machines are employed chiefly to transfer grey yarn from cops, ring and throstle bobbins, on to warper's bobbins ;

2. Drum winding machines are employed chiefly to transfer yarn from hanks that have been previously bleached, dyed, or otherwise treated either on to warper's bobbins, or else on to spools.

"Ball warp" winding machines which transfer threads from ball warps that have been previously bleached or dyed, and re-winding them on to warper's bobbins for re-warping.

The primary object of winding is to obtain separate and continuous threads of considerably greater length than that in which they are produced during spinning, and also to place the threads in a more compact form adapted more suitably for the subsequent operation of warping. Incidentally advantage is taken of at this stage to improve the quality of the yarn by removing from the threads such defects as are liable to occurduring spinning.

3. WARPING.

The operation of warping consists of withdrawing and gathering together any practicable number of threads simultaneously from a corresponding number of warper's bobbins or spools in order to obtain a series of parallel threads of uniform tension and length.

The particular form into which yarn is converted at this stage is determined chiefly by the method of warping adopted. There are three principal methods in vogue with various modifications :

1. Beam warping.

2. Mill, heck, ball or chain warping.

3. Sectional warping. The operation of warping is of paramount importance.

4. SIZING.

Sizing is the most important preparatory process to which cotton yarns are subjected previous to their being woven into cloth. This is a process of impregnating yarn with a compound solution of which starch in one or other form constitutes the bulk. The other ingredients entering into its composition are often oily, mineral, and chemical in nature.

The pimary object of this treatment of warps is to make the yarn smoother and stronger, by laying down the ends of fibres that project from the main body of the threads, thereby enabling them to more effectually withstand the tensile strain and abrasive friction to which they are subjected. By this process also the cloth is imparted a soft and mellow feel, and a superior finish. An increase in weight is also attained. There are two distinctly different methods for the process of sizing.

1. Beam warp or tape sizing
2. Ball warp sizing.

They are to be adopted according to whether warps are produced by the method of beam warping or by ball or sliver warping.

1. Tape sizing is the principal method used in the cotton trade for incorporating the size with the yarn and the tape frame, or slashing machine is the most important machine used in the preparation of the yarn for weaving.

2. Ball sizing is a process particularly adapted for sizing coloured yarns but for ordinary grey yarns, and for grey yarns of fine counts, it cannot compete with tape sizing In ball-sizing three separate processes are involved, viz , sizing, drying, and beaming whereas in tape sizing the whole of these processes are performed in one operation.

Ball sizing produces a round and very pliable yarn.

5. BEAMING OR WINDING-ON.

This is the final stage in the series of operations involved in the actual production of a warp, and consists of transferring threads simultaneously from a set of ball or other form of sliver warps, or from a set of beam warp, or from a set of warp sections depending on the method of preparation of the warps and of winding them with an even parallel disposition finally on to a weaver's beam ready for looming.

6. LOOMING.

This is the operation of harnessing the warp to the shedding harness consisting either of a set of healds or of a jacquard mounting. It is effected by any of the following methods :—

1. Drawing-in—This consists of drawing warp threads, in consecutive rotation, through the respective loop eyes or mail eyes of the shedding harness in a specified order and also of subsequently passing them, usually in pairs, between successive dents or divisions of a reed. The specified order is indicated by a prepared chart or plan techincally known as the "draft."

This operation is absolutely necessary in all instances when a new shedding harness is employed for the first time and also when the threads of a new warp require to be passed through the eyes of the harness in a different order of succession from that of the previous warp-ends.

Twisting and Tying—If, however, the harness has previously contained a warp which is being replaced by one containing approximately the same number of warp-ends and composed of yarn of similar character and counts, and also if the warp-ends are required to pass through the harness eyes with precisely the same order of drafting as the previous warp, then the operation of looming may be effected either by means of twisting or else by tying, whereby the successive threads of a new warp are separately joined in consecutive rotation to the corresponding threads forming the remnant of the previous warp whilst this is still retained in both the shedding harness and reed.

7. GAITING OR TUNING.

These operations comprise all the preliminary duties involved in the proper relative adjustment, fixing, and tuning of the various parts of a loom and its numerous appurtenances so that they will all act in perfect harmony, and which are necessary to establish the loom in good working condition ready for the final operation of weaving.

8. WEAVING.

This is the final stage in the routine of textile manufacture, and consists specifically of effecting a combination of the respective series of warp and weft threads by interlacing them in a prescribed and systematic order, as indicated by the design, to produce a texture or web of cloth.

Power-Looms.

The origin of weaving is merged in antiquity ; it was certainly one of the very earliest arts, and the high degree of perfection to which it has been brought is due, first to a gradual evolution of the science of textile design and the art of weaving, and secondly, to the phenomenal advances in mechanical engineering.

Power-loom weaving had its origin in England and the idea of imparting motion to the entire loom from one of its parts dates as far back as the sixteenth century.

Edmund Cartwright must be consi- the actual inventor of the power-loom.

POWER-LOOM WEAVING.

By the term "power-loom" is understood a machine in which the motions necessary for the production of a textile fabric, are effected automatically. The movements in question are transmitted throughout the entire mechanism by means of a portion thereof known as the driving gear of which there are three varieties.

(1) Pulley driving gear or the English system.

(2) Friction gear, on the German system.

(3) Lock wheel and pawl gear or Schouherr system.

(1) The pulley driving gear, consists of two pulleys, (a) "fast", i.e., keyed or screened on to the driving shaft of the loom, to which it transmits motion. (b) "loose", i.e., loosly mounted on the shaft, for the purpose of bringing the loom to a standstill.

(2) The friction driving gear consists of a conical boss firmly keyed or otherwise fixed to the shaft, and of a driving pulley, the nave of which is hollowed to fit the said cone, the pulley itself being mounted loose on the shaft. The cone may be either turned smooth or covered over with leather.

(3) Fast-and-loose-pulley gear is mainly used in light, quick-running looms, whilst friction gear is employed more for heavy machines.

Looms are usually named either after the system of construction, the maker, or the class of goods for which they are destined. Generally they are classified according to

(a) The lifting arrangement inside or outside treadles, dobbies and jacquards.

(b) The mode of changing the shuttles : single shuttle looms, circular box looms, eccentric circular box looms, drop box looms, etc.

(c) The picking motion : under pick, central pick, over-pick.

The following is a list of well-known looms : Artherton, Crompton, Dickinson, Hodgson, Hattersley, Haggenmacker and Wassermann, Knowles, Schonherr. Smits Brothers, and other systems.

CLASSIFICATION.

Looms may be divided into three classes, viz.,

(a) tappet

(b) dobby and

(c) jacquard looms.

(a) Tappet looms are so named by reason of the mechanism employed to control the healds. This class include the plain loom fitted with inside tappets to take from two to eight heald shafts, or with outside tappets to accomodate up to twelve shafts. Many tappet looms are mounted with boxes, at one or both sides. Such looms are generally employed to weave any class of fabric which does not require a large number of healds, and in which the weave is complete on not more than 12 picks.

(b) Dobby looms are so named on account of the healds being operated by dobby mechanism, which is entirely different in its construction from tappet mechanism. Dobbies are made to accomodate even up to 48 shafts.

The loom is usually mounted with a series of boxes at both sides ; and it may also be fitted with two warp beams. The range of fabrics produced in this loom is very wide while it may yield more extensive patterns than the tappet loom.

(c) Jacquard looms denote those looms which has reference to those looms which are mounted with a jacquard machine. The advantage of such looms, when compared with the dobby and tappet looms, is the increased figuring capacity, as the number of threads which a design may occupy is practically unlimited. Fabrics of an ornamental and elaborate character are produced in this loom.

WEAVING.

The operation of weaving consists of the interlacing of two sets of threads or yarns. For the sake of distinction these two sets of yarns receive different names.

(1) Those threads which form the length of the fabric, and which are parallel to the selvages, are known as the "warp".

(2) Those which cross from selvage to selvage, that is from edge to edge of the cloth, are known as the "weft" (or filling or woof).

With certain exceptions, these two sets of yarns, warp and weft, interweave with each other at right angles, so as to become locked, as it were, together, and thus form a compact and more or less solid substance which is known in a general way by several names.

The number of different ways in which these two sets of yarns can be interlaced with each other to form different patterns is infinite,—first on paper and then by the warp and weft in the loom—is known universally as "textile design". On the other hand, the mechanical or manual operation of causing the warp and the weft to interlace with each other in any of these desired orders is known as "weaving".

Healds in one form or another have been employed for many centuries to divide the warp, because under certain conditions they supply the most perfect means of accomplishing this work, which is technically known as shedding.

Shedding, or forming a passage for the shuttle through the warp threads, certain of the threads being definitely raised and the others depressed—threads lifted and depressed being varied for a succession of sheds.

Picking, or the throwing of the shuttle through the shed which has been formed, leaving the pick or weft thread behind it in the shed.

Beating-up, i.e. the reed beating the pick just inserted up to the cloth already formed to make a firm, even texture.

Letting-off, i.e., unwrapping warp from the warp-beam to take the place of that used up in interlacing with the weft to form the cloth.

Taking-up, i.e., winding up on to the cloth beam the cloth woven, this movement of necessity being worked in conjunction with the letting off.

Final Processes.

Woven fabrics are composed of longitudinal or warp threads and transverse or weft threads, which are interlaced with one another according to the class of structure and form of design that are desired. The terms "chain" and "twist" are applied to the warp, and the warp threads are known individually as "ends", while the terms "packs" and "filling" are applied to the weft threads.

Woven textures may be conveniently divided into three principal classes, as follows :—

(1) Fabrics in which the ends and picks intersect one another at right angles, and in the cloth are respectively parallel with each other.

(2) Cloths in which certain of the ends interweave alternately to right and to left of adjacent ends.

(3) Pile or plush fabrics in which a portion of the threads projects from a foundation cloth and forms a nap or pile on the surface.

PIECE-GOODS.

The number and variety of piece-goods is almost countless. They may be either "plain woven" or "fancy woven". In the case of the first, the warp or vertical and weft or transverse threads of the cloth are both homogeneous but not necessarily the same. In the finishing of piece-goods infinite variety is also possible. Plain woven grey cloth may be bleached, dyed, mercerized, printed, etc.

Washed yarns, whether dyed or not, require stiffening ; this treatment being the more essential in proportion as the fabric is more closely woven and the yarns themselves are finer in count. For this purpose, sizing preperations are used, the warp yarns to be sized being either dipped in the preparation, or else brushed over with the same after having been placed in position in the loom and stretched, a moderately stiff brush being used. In selecting and compounding the sizing preparation, regard must be had to the purpose in view, adhesive ingredients being requisite in order to strengthen the yarn, whilst at the same time, the materials chosen must be such as will not injure the threads or the colours with which the latter are dyed.

SIZE FOR COTTON.

Prepare a solution of ¾ part of copper sulphate in 140 parts of water, treated to 129°F. in a copper pan. Also stir up 17 parts of potato starch with 28 of water at 91°F. Pour the mixture into a copper pan and boil the whole for half an hour, stirring all the while with a wooden spatula.

SIZE FOR COTTON YARN.

Boil 25 parts of potato starch in 100 parts of water, after which add in succession oxalic acid 0·13 part, tallow 0·5, lard 0·25, soda 0·1. Boil the whole mass for 5 or 6 minutes.

FINISHING.

The finishing of fabrics comprises all the operations—apart from bleaching and dyeing—which improve and complete the material. The finishing process may thus be regarded as one of beautifying, completing, improving the appearance and concealing defects.

All dressings consist of substances that are either soluble in water or merely capable of being disseminated in that liquid. The most important ingredient of the dressings for cotton goods is starch.

COTTON DYEING.

Cotton is mainly dyed in the form of hanks of yarn and warps, less usually as piece-goods. The dyeing of cotton on spools or cops is now rapidly extending, two types of machines being in use. In one type the cops are placed on perforated or grooved skewers and the dye liquor forced through, by a pump (skewer dyeing). In the other type the cops are closely packed in a tank, compressed, and the liquor forced completely through the whole mass (pack dyeing). In warp dyeing a number of warp pass side by side continuously through a series of vats containing the necessary mordanting or dyeing liquors. Cotton in the form of piece-goods is dyed in the open width or rope from, usually the former.

Cotton has little affinity for metallic mordants or for dyes belonging to the mordant, acid, or basis groups. It has however, a definite affinity for tannic acid and for colouring matters belonging to the class known as "direct dyes." Cotton is dyed largely with this group, but the dyed colours, though bright and in some cases fast to light, are not fast to washing with soap. Many of these direct dyes are also affected by acids. A considerable number (but not all) of the direct dyes may be rendered satisfactorily fastly an after treatment with metallic salts or by "diazotizing and developing" this applying principally to dark browns, blues, and blacks.

Dyeing Recipes.

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1. Scarlet.

Dissolve 2 tolas scarlet dye in clear hot water. Bring it to boil and then add 1 dr. alum and 1 dr. cream of tartar (in powder). Remove when the coloration is bright. Steep 4 pieces of cloth in the solution; allow to drip and dry in the shade.

The tint of the colour may be made deep or light by the addition of less or more water as desired.

2. Turkey Red.

First dissolve 1 oz. pearlash in 1 gal. water. Steep the cloths to be dyed in this solution and bring to boil. Wring out the cloths and dry them. Then digest 1 oz. annatto seeds in clear boiling water. Steep the cloths in the solution of the dye : wring out and dry them. Again steep the cloths in alum solution and dry ; repeat this operation twice in succession. After that digest a quantity of madder in water and steep the cloths in this solution. Dry them and finally wash them with soap.

3. Red.

Brazil wood (in fine chips) ½ lb. ; alum 2 oz ; cream of tartar 2 oz.; water 4 seers.

Digest the chips in water in an earthenware vessel. When the water becomes tinted add the alum : the coloration will then be more bright. Now add the tartar. Boil for some time and strain through a cloth. Add to the extract 1 dr. aniline salt and soak 4 pieces of cloth in it for 24 hours. Wring out and dry in the shade.

4. Dark Red.

Lac 1 sr ; water 5 sr ; alum 1 oz. Clean the lac and powder finely. Digest the powder in boiling water and strain the coloured solution. Heat the extract again, add the alum and boil for some time. After removal soak 5 pieces of cloth in the solution, drench them thoroughly, wring out and dry.

5. Green.

Select good turmeric 1 ch. and grind [illegible] into fine paste : dissolve the same in 4 seers of water. Add to it a little ripe tamarind and alum.

Soak the cloth in this prepared water and dry. Then steep it again in a solution of blue dye for some time : wring out immediately.

6. Blue.

Treat 1 part good indigo with 4 parts sulphuric acid. Incorporate 1 part carbonate of potash in the mixture and add 8 times water. Stir thoroughly so as to make a uniform liquid.

Now dissolve 5 parts tartar and 3 parts alum in water. Steep the cloth in this solution wring out and dry. Then soak the cloth in the dye solution prepared above, Boil for some time. Take off when the desired tint is attained.

7. Blue.

Grind 4 ch. good indigo (natural indigenous product) with water to a fine paste. Dilute the pulp with 5 srs. water in a vat and set aside for one month. Then add 1 oz tartar and 2 oz. alum (powdered). Now soak in this dye 25 yards of cloth for three days. Wring out and dry.

8. Violet.

Take 4 drs scarlet dye : 4 drs. blue majenta ; stir them in 5 srs. of water. Add to the solution 2 dr. powdered alum Soak 8 or 10 pieces of cloth in this : wring out and dry.

9. Yellow.

Annatto seeds 1 sr , crude soda 1 ch., water 5 srs. Steep the solids in the liquid for 4 hours. Then boil for one hour in an earthenware vessel. Take off when the water is coloured ; strain through a cloth. Soak the cloths in the solution ; wring out.

Next dissolve 1 ch. alum in 1 sr. water and steep the dyed cloths in this solution. Wring out and dry in the shade. The dye will be fixed on the cloths by this mordant.

10. Yellow.

Take 2½ srs wood of jack tree and pound the same in fine chips. Then bring to boil 1 md. of water in an earthenware vessel and add the wood together with 1 ch alum in powder. Boil over a slow fire until only 10 srs. of a coloured liquid remains. Strain when cold. Soak the cloths in the extract for 4 hours. Then wring out and dry.

11. Yellow.

Pound 1 sr. of jack-tree wood into fine chips ; grind 4 ch. of turmeric into smooth paste ; powder ½ ch. alum. Digest the above ingredients together in 30 srs. of water in a suitable earthenware vessel over fire. Take off when only 10 srs. will be left and strain when cool.

Now soak the cloths in this extract for 1 hour : wring out and dry. Repeat this operation for three times and the cloth will be beautifully coloured.

12. Orange.

Annatto seeds 1 sr. ; the kamela dye 1 sr. ; alum ½ ch ; crude soda 1 ch. Water 10 seers.

First steep annatto and soda together in 1 seer of water for 4 hours. Macerate them thoroughly and mix in the kamela dye. Boil the whole on fire when a quarter of the water has evaporated, take off and add powdered alum. Strain the extract soak the cloths in it for an hour wring out and dry.

13. Black.

Brazil wood chips 4 ch. ; copper sulphate powder ½ tola ; clear water 2½ srs.

Boil the ingredients in water. When the extract is coloured, steep the cloths and continue boiling for 4 hours in gentle heat. Then wring out and dry.

14. Black.

Chebulic Myrobalan, Beleric Myrobalan, the Emblic Myrobalan, bark of Babla, Tourhi pods each 1 seer : water 10 or 15 seers. Pound the solid ingredients thoroughly and reject the seeds. Then soak them in water in an iron vessel and leave aside for 1 month to ferment. Now boil the whole for 1 hour and strain when cool. Soak the cloths in this extract for 4 hours. Wring out and dry.

15. Golden.

Scarlet dye 1 tola : yellow magenta 1 tola ; water 5 seers ; alum (powdered) 1 dr.

Dissolve the dyes in water and add the alum. Soak the cloths in the solution ; wring out and dry.

16. Red.

Brazil wood 2½ srs ; Lodh wood 1 sr : ferrous sulphate 4 drs. Pound the wood into fine chips ; Boil them in 10 srs. of water. Take off when the decoction is deeply coloured only 4 srs. of the extract will be left. Strain and add the sulphate. Soak the cloths for one hour ; wring out and dry.

DYEING YARN.

17. Blue.

Brazil wood 1 seer : copper sulphate 1 dr : water 4 seers.

Pound the wood into fine chips and digest the same in boiling water. When deeply coloured strain the extract and add copper sulphate. Soak the yarn in it ; wring out and dry.

18. Blue.

Take country indigo 8 ch. ; macerate it and dissolve in 5 seers water. After 15 days add 1 oz aniline salt. Soak the yarns to be dyed and knead thoroughly. Set aside for 1 hour ; then wring out and dry. A bright colour will be obtained if the process is repeated three times.

19. Black.

Gallnuts 1 seer : Chebulic Myrobalan 1 seer : Beleric Myrobalan 1 seer; Emblic Myrobalan 1 seer. Water 10 seers.

Pound the gallnuts and myrobalans rejecting the seeds. Then bring the water to boil in an iron pan, throw in the solids ; and allow them to be digested for half an hour. Remove and set aside for twenty days. Next strain the extract and add 2 oz. aniline salt. Soak the yarn and boil for 15 mins. Set aside the whole thing for 1 day. Then wring out and dry. Soak the yarn again for 1 hour and dry. By repeating this process for 3 or 4 times a deep colour will be obtained.

BLEACHING.

The cloths and yarns which are to be dyed must first be cleansed and bleached as otherwise the effect will not be satisfactory. For this purpose the following process may be adopted.

Shred 1 sr good soap into tears and boil the same in 5 srs water in an earthenware vessel. When thoroughly dissolved add 1 ch powdered borax. On ebullition brow in the cloths or yarns to be bleached; stir them thoroughly and boil the whole for some time in the evening. Next morning wring them out ; and dry in the sun.

On no account should soda be added.

SIZING

(1)

Arrowroot 1 sr ; water 8 srs. First dissolve the arrowroot in a little cold water. Then bring the water to boil in an earthenware vessel and stir in the dissolved arrowroot. Stir vigorously and continuously. Remove after half an hour and strain. The cloths to be sized (plain or dyed) are dipped in this prepared size ; squeezed gently and stretched out to dry.

(2)

Soak 1 sr. Khai (parched paddy) in 5 srs. hot water Macerate the puffed grains into a pulpy mass through a sieve. Dilute the same with the whole of the water, strain again and proceed as above.

PRINTING.

Red.

Take 1 oz Vermilion dye and 1 dr. ferrous sulphate. Macerate them with linseed oil until a thick fluid paste is obtained. Prepare a soft flannel pad and besmear one side of it with the dye.

Now fix on an wooden table a piece of cloth folded 6 or 8 times to serve as a pad. And on this spread the cloth to be printed tightly. Then place the wooden blocks on the flannel pad so that the engraved designs may take up some dye. Hold the blocks in proper position on the cloth and tap with wooden club. The dye will adhere to the cloth resulting in fine print. Repeat the process all over the stretched cloth. Finally dry in the sun.

The operation is conducted much on similar lines to that of stamping with rubber stamp.

Blue.

Country indigo 2 oz ; ferrous sulphate 1 dr : Grind these into a fluid paste with linseed oil. Proceed to print as above.

Black

Lamp black 1 oz ; ferrous sulphate 1 dr. Grind these into a fluid paste with linseed oil. Proceed to print as above.

GLOSSARY.

Kamla guri = The Kamela Dye of Mallotus philippinensis.

Lodh kath = The Lodh Tree, Symplocas racemosa.

Touri = Pods of Caesalpinia Digyna (like divi divi.)

Babla = Acacia arabica, Indian gum arabic tree.

Khoi = the product obtained by parching paddy.

Bakam kath = Brazilian wood, Caesalpinia sappan.

Bahera = The Beleric Myrobalan, Terminalia belerica.

Harra = The Chebulic Myrobalan, Terminalia chebula.

Amlaki = The Emblic Myrobalan, Phyllanthus emblica.

In the preparation of dye extracts from vegetable products the quantity of water required for digestion may be increased or decreased according to the strength of the tint desired. Again to make this uniform, fast and permanent the cloth may be treated with the dye 3 or 4 times in succession.

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Statistics.

THE WORLD'S SPINDLES.

According to a comprehensive and valuable return issued by the International Cotton Federation at the end of the year 1920, the number of active cotton spindles in the various countries of the world was as follows :—

Great Britain	58,692,410
France	9,400,000
Germany	9,400,000
Italy	4,514,800
Czecho-Slovakia	3,584,420
Spain	1,800,000
Belgium	1,572,000
Switzerland	1,536,074
Poland	1,400 000
Sweden	670,350
Holland	507,942
Portugal	482 000
Finland	239 828
Denmark	116,644
Norway	72,724
India	6,689,680
Japan	3,600,090
China	1,600,000
United States	35,872,000
Canada	1,200,000
Mexico	720,000
Brazil	1,600,000
Total	145,540,962

These figures represent the productive spindles, but it must be borne in mind that the proportion of them which are active vary according to the state of the trade and according to commissions for repair.

IMPORTS OF COTTON MANUFACTURES.
(including Twist and Yarn).

	1921-22 in Rs. (1000)
United Kingdom	473991
Japan	64792
Netherlands	10976
Italy	2661
United States	8060
Belgium	1293
Switzerland	3152
China	444
Germany	634
Straits Settlements	742
France	96
Austria and Hungary	24
Kenya Colony	20
Other Countries	2496
Total	569381

EXPORTS OF INDIAN COTTON MANUFACTURES
(including Twist and Yarn).

	1921-22 in Rs. 1000
Honkong	39846
China	15879
Straits Settlements	19457
United Kingdom	729
Turkey, Asiatic	4
Persia	16004
Aden and Dependencies	6971
Ceylon	10320
Egypt	4587
Kenya Colony	3226
Siam	4431
Natal	2659
Portuguese E. Africa	3027
Muskat Territory	1545
Tanganyika	1695
Bahrein Islands	1894
Maritius and Dependencies	1184
Other Countries	23049
Total	156507

Imports of Cotton Manufacture.

	1913-14 (Rs. lakhs)	1922-23 (Rs. lakhs)
Piece-Goods		
Grey (unbleached)	2545	3044
White (bleached)	1429	1501
Coloured, printed or dyed	1786	1260
Tents of all description	54	46
Total Piece-Goods	5814	5851
Hosiery	120	80
Handkerchiefs & Shawl	89	16
Thread	39	70
Other sorts	152	70
Grand Total	6630	7013

IMPORTS.

Foreign Merchandise.

	1920-21	1921-22
Cotton Twist & Yarn		
Quantity in lbs	47333495	57124612
Value in Rs.	135783000	115122000
Cotton Manufacturers		
Quantity in Yards	1511454884	1090421921
Value in Rs.	865417000	454259000

EXPORTS.

Indian Manufactures.

	1920-21	1921-22
Cotton Twist & Yarn		
Quantity in lbs	82535220	81033404
Value in Rs.	101715000	77146000
Cotton Manufacture		
Quantity in Yards	146364793	160966778
Value in Rs.	80908000	79361000

RE-EXPORTS.

Foreign Merchandise.

	1920-21	1921-22
Cotton Twist & Yarn		
Quantity in lbs	332352	568786
Value in Rs.	789000	1130000
Cotton Manufactures		
Quantity in Yards	60990737	73671851
Value in Rs.	37945000	38514000

COTTON MILLS IN INDIA.

I—British India.

Province		Number	Labourers	Looms	Spindles
Madras		15	24414	3191	465816
Bombay		178	238084	100996	4752893
Bengal		13	12843	3002	341656
United Provinces		15	18268	5165	479704
Punjab		3	4176	287	43348
Central Province & Berar		9	15556	4967	243598
Ajmer Merwara		2	1443	693	24948
Delhi		2	1444	601	23597
Total	1921-22	237	313228	118902	6375560

II—Indian States and Foreign Territory.

States	Number	Labourers	Looms	Spindles
Hyderabad	3	2932	834	63792
Mysore	2	4399	674	43002
Baroda	4	2562	1180	53456
Central India	6	7923	3616	109978
Cochin	1	390	188	—
Bombay States	12	2246	829	45639
Central Province State	1	1930	478	29312
Travancore	1	660	—	24000
French Settlements	4	5674	1613	69444
Total 1921-22	34	28716	9412	438713

Cotton Spinning and Weaving establisments not classed as Mills.

	Nos.	Workers
Madras	69	2536
Bombay	27	899
Bengal	2	150
Mysore	1	150
Hyderabad	17	1839
Central India	2	191
Total	116	5683

COTTON MILL PRODUCTION FOR 1921-22.

	British India.	Indian States & Foreign Territory
Yarn	000 lbs.	000 lbs.
Counts 1 to 20	440138	30490
,, 21 to 30	193330	9832
,, 31 to 40	16707	193
,, above 40	2364	1
Wasters etc.	472	45
Total	653011	40561

COTTON MILL PRODUCTION FOR 1921-22.

		British India	Indian States and Foreign Territory
WOVEN GOODS—			
Grey and Bleached piece-goods			
Chadars	000 lbs	18960	752
Dhutis	,,	92365	3793
Drills and jeans	,,	12800	2576
Cambrics and lawns	,,	1256	37
Printers	,,	6334	1704
Shirtings & long cloth	,,	104247	5727
T-cloth, domestics and Shirtings	,,	17785	1331
Tent cloth	,,	3160	87
Other Sorts	,,	18233	8890
Total		275140	24897
Coloured piece-goods	000 lbs	94470	3963
Grey & coloured goods other than piece-goods	000 lbs	3045	8
	Doz.	629087	288
Hosiery	000 lbs	230	153
	Doz.	130989	—
Miscellaneous	000 lbs	1156	281
Cotton goods mixed with silk and wool	000 lbs	178	—
Total	000 lbs	99079	4405
	Doz.	760076	288
Grand Total	000 lbs	374219	29302
	Doz.	760076	288

Our District Possibilities.

ORISSA FEUDATORY STATES.

Introductory.

THE Feudatory States of Orissa consist of a group of 24 dependent territories attached to the Division of Orissa, and comprise the following states: Atgarh, Athmallik, Bamra, Baramba, Band, Bonai, Daspalla, Dheknanal, Gangpur, Hindol, Kalahandi, Keonjhar, Khandpara, Mayurbhanj, Narsingpur, Nayagarh, Nilgiri, Pal Lahara, Patna, Rairakhol, Ranpur, Sonpur, Talcher and Tigiria. They have a combined population of over 3 millions and a total area of about 30 thousand square miles. They are bounded on the north by the State of Joshpur in the Central Provinces, the districts of Ranchi, Singhbhum and Midnapore; on the east by the districts of Balasore, Cuttack and Puri; on the south by the districts of Ganjam and Vizagapatam and Khondmals: and on the west by the Raipur district and Raigarh State and the districts of Sambalpur and Vizagapatam.

The States form a succession of hill ranges rolling backwards towards Central India. They form three watersheds from south to north, with fine valleys between, down which pour the three great rivers of the inner table land. The peaks are densely wooded to the summit, and except at the regular passes, are inaccessible to beasts of burden. The intermediate valleys yield rich crops in return for negligent cultivation and a vast quantity of land might be reclaimed on their outskirts and lower slopes. Cultivation is, however, rapidly extending in all the States, owing to improved means of communication and to the pressure of population in the adjoining British districts. The principal rivers are the Mahanadi, the Brahmani, the Baitarani, the Burabalang, the Ang and the Tel.

Natural Resources.

The Orissa Division consists, geologically as well as geographically of two very distinct portions; the one, a belt of nearly flat country, extending along the coast; and the other, an undulating area broken by ranges of hills, in the interior. The inland hill tract which forms the area covered by the Feudatory States is chiefly composed of rocks of very ancient date. The greater portion of this area has never been explored geologically, and the information procurable as to their character is most imperfect. A geological survey was once conducted over the greater part of Mayurbhanj and recently the coal fields at Talcher have attracted public notice.

The basin of sedimentary rocks known as the Talcher coalfield extends about seventy miles from west by north to east by south, with a general breadth of from fifteen to twenty miles. It comprises nearly the whole of Talcher, and a considerable portion of Rairakhol, with smaller parts of Athmallik, and Dhenkanal.

In several places in the Talcher field, iron is worked. Sometimes the iron stones of the Damodar beds are used, but more frequently surface concretions, the supply of which is necessarily limited. The method of smelting the iron in small furnaces is similar to that in use in other parts of India; but the bellows employed are worked with the foot.

The State of Keonjhar is believed to contain good deposits of iron.

The enormous resources of iron ore in the Gurumahisini hills in the State of Mayurbhanj are well known and are exploited by the Tata Iron & Steel Co. at Jamshedpur.

Lime stone quarries are worked near Bisra along the banks of the Koel river in the north-eastern portion of Gangpur. Lime of excellent quality is produced and exported to Calcutta and elsewhere. Deposits of manganese are found in several parts of this State.

Graphite of good quality is found in Kalahandi State. Graphite is also found in Athmallik and Patna. Bauxite is found in this State as a superficial deposit.

Dolomite deposits in Gangpur State have been worked Manganese in fair quantity is found in the same State. The granite quarries in the Nilgiri State have been exploited.

The hils bordering on Balasore consist entirely of metamorphic rocks of various kinds. A kind of black magnesian rock intermediate in composition between potstone and serpentine, approaching the former in appearance, but less greasy in texture, is quarried to some extent, chiefly for the manufacture of stone dishes, plates and bowls. The stones are roughly cut into shape in the quarry, and finished, partly with tools and partly on a lathe, in the villages.

Forest.

The narrower valleys are often terraced for rice cultivation and these rice fields and their margins, abound in marsh and water plants. The surface of the plateau land between the valleys, where level, is often bare and rocky, but where undulating, is usually clothed with a dense shrub jungle. The steep slopes of the hills are covered with a dense forest mixed with many climbers. Timber trees, plants and shrubs abound.

Agriculture.

The states of Orissa present very varying conditions of soil and conformation of surface, from the bare rock of the mountain peaks, the loamy but rocky soil on the hill slopes, the rich deposits of the valleys in the hills to the wide open plains along the course of the large rivers of the country. In all cases, however, the system of agriculture is the same and is entirely dependent on rainfall. Canals and embankments on any large scale are unknown, though in Bamra, Mayurbhanj and Dhenkanal a commencement has been made in this direction.

In nearly all the States the most primitive system of cultivation, *dahi* or *Jhum* is pursued alongside regular systematic cultivation: the degree to which this primitive system is followed in each State depends upon the amount of forest or open country available.

The system of cultivation generally in vogue has the following forms:—

(1) Regular *(jami)* rice cultivation; (2) Upland *(at, gora, tour)* cultivation of rice entirely dependent on the rainfall; (3) cultivation of oil-seeds, millets, and

cotton on high clearings in forest land (*beura*); and (4) lastly the regular *dahi* or *jhuming*.

The staple crop is rice, of which generally speaking two varieties are grown, *viz.*, *aus* or *biali* reaped in September, and *aman* or *sarad*, the late winter rice, and chief crop of the country. This principal food crop is supplemented by millets, such as China, mandia or marua, etc., and maize and pulses form a large part of the dietary of the people, including *birhi*, *muga kulhi*, *rahar* and *gram*. The chief oil-seeds grown are mustard, sesamum and castor oil-seeds, castor oil being sometimes used by the poorer classes for cooking. Sugar cane is extensively cultivated and a considerable export trade is carried on in the sugar manufactured. Wheat grows luxuriantly in the hill area of the Kalahandi State.

Cotton is largely grown, but is mostly of an inferior quality: a good deal of it is locally manufactured for home use, but a certain quantity is exported. Tobacco is raised on the rich silt deposits of rivers and near home-steads, where cattle manure is plentiful. Turmeric is extensively grown for export and all the ordinary vegetables are cultivated, the commonest being the brinjal or egg-plant and pumpkin The forests produce various edible roots, such as the large yam (*kanda*) arrowroot (*tikhuri*).

Sericulture is also being carefully and scientifically carried on in the States of Mayurbhanj, Dhenkanal and Keonjhar: both shrub and tree mulberry are grown.

Buffaloes and bullocks are employed in ploughing; cows and she-buffaloes are prized for their milk.

MANUFACTURES.

The States are not remarkable for any very special manufactures; at Kantilo in the Khandpara State and in the Narsingpur State a considerable manufacture of brass utensils is carried on: these find their way throughout the States, but are entirely of the ordinary pattern and in no wise remarkable either for design or workmanship. The next most important industry is the weaving of tusser cloth at Sonpur and Binka in the Sonpur State.

Silk and cotton cloth of excellent quality and artistic patterns are manufactured at Maniabandha, in the Baramba State. In the States of Rairakhol and Athmallik a considerable number of Lohars (smiths) find occupation in smelting iron, which is of excellent quality and highly valued. In Band, Daspalla, Dhenkanal, Khandpara, Mayurbhanj and Talcher blacksmiths make, for local use, iron implements, such as axes, bill-hooks, crow-bars, shovels spades, sickles and knives, some of which are very well turned out. In Dhenkanal and Nayagarh ivory work of good quality is still made by one or two families, and in Band there are skilful silversmiths. In Bonai the Bhumij fashions utensils from the soapstone found there, and similar vessels are manufactured in the Nilgiri State. In almost all the villages of the States are found the local cotton weavers: the cloth woven is very coarse: it is however very much more durable than the mill-made article. The weavers do not earn much. Save the above home industries there are no manufactures in the States properly speaking. The villages are self-contained with their own blacksmith, potter, carpenter, etc.

TRADE.

Traders in the States are represented by itinerant dealers from the British districts: there are but very few local traders. Trade is carried on principally in rice, pulses, oil seed, etc., and timber and other forest produce in return for salt dried fish, imported cotton piece-goods, cotton twist and kerosene oil; tusser cocoons are also exported. There is a considerable export trade in hides and horns. Most of the export and the import trade is carried on with Cuttack and to a smaller extent also with Balasore, Puri and Sambalpur.

Catgut for Musical Instrument.

CATGUT is prepared from the intestine of sheep, which are properly treated for industrial application. Catgut is used for rackets or battledores, whiphandles, hatters' bows and by clock makers. Of all the cords from intestines, however, catgut for musical instruments is the most difficult to make, and requires the greatest care and ability of the workmen.

The cleaning and scraping of the intestines for the purpose, to free them from this fat, must be done with much more care than is requisite for other cords ; and, when they have undergone that process, they must be steeped in an alkaline lye, prepared as follows :—An earthen pan, holding six quarts is filled with water, and three pounds of potash are added to it ; which must be well stirred, and suffered to subside. In a a similar vessel, full of water, placed by the side of it, are put five pounds of pearl ash ; leaving that also to settle. If it be required to make use of this solution within short notice, it will be necessary to add to it a little alum water thereby clarifying the solution quickly.

The scraped intestines are now put into earthen pans, so that they are half full. The pans are then filled up with a quantity of the solution of potash, adding next an equal quantity of water. This liquid is changed twice a day, increasing its strength each time, by adding more of the solution of pearl ash, and diminishing progressively the quantity of water : so that the last solutions are the strongest. The intestines gradually become whiter, and begin to swell. They are allowed to macerate from 3 to 5 days or more, according to the state of the atmosphere.

Every time that the alkaline solution is changed, the pans are placed upon a box, technically known as the "refresher." It is fixed on a table or on tressels in a standing direction, so as to facilitate the running off of the water. This box must be large enough to hold the frame on which the cords are to be stretched. The intestines are scraped with the edge of a copper cube, held in the left hand. The forefinger of the left hand is placed near to the edge of the copper cube ; whilst, with the right hand, each intestine is drawn over the edge of the cube and between the forefinger.

While they have all been treated in this manner, and placed in a fresh pan, a stronger alkaline solution is poured on to them than that from which they were last taken. This operation is necessary for cleansing the intestine of its greasy quality, and bringing the cords to perfection.

As soon as it is perceived that the intestines begin to swell, and some little bubbles appear on their surface, it is necessary to twist them immediately, or they will begin to shrivel ; which sometimes happens, particularly in summer, and occasions the loss of the intestines, and also the time spent over them. In hot weather, the intestines are, indeed, most easily cleaned from fat ; but then the workman must be more than ordinarily attentive; and the different lyes for the washings must be made stronger with alkali, and applied more quickly. In winter, all goes on in better order, and the operation is more certain. The manufacturers of this article generally have their workshops located in cool places, where there is a little dampness.

The intestines being now ready to be twisted, they are taken out of the alkaline solution. Some manufacturers plunge them again into fresh water, and wash them well therein; but, although they become, by this method, of a better colour, and take the sulphur better, they run the risk of being weakened.

To twist and finish the cords, a handy machine is used. It consists of a frame, two feet high, and five feet long; on one end of which are placed a number of pegs, and in the opposite end are bored, with a large auger, a number of holes, inclined in such a way, that when pegs are placed in them, to attach the cords to, they may not be liable to slip and come out. The intestines are now selected according to their size; and two or three of them are taken, and the ends twisted round one of the pegs first placed; and the other ends are carried to the opposite ones, and attached to them. Two turns of the intestines around the pegs are sufficient to prevent their slipping. When fixed to the pegs, they must not be drawn tight; as they would be liable to snap during twisting, if sufficient play were not given to them for that operation.

If any of the intestines should be found too short to reach the opposite side of the frame they must be lengthened by pieces cut off any others which may be too long: and care must be taken to make the ligature near the last placed peg, to preserve the cord of an equal size in its whole length; as otherwise it would be false in its tone.

The frame being filled up in the above manner two or three of the pegs, bearing one end of the intestines, are fixed to spindles, if the machine contains several and turned round several times; passing the finger and thumb of the left hand frequently from one end of the cord to the other, beginning at the spindle. When all the cords have undergone this operation, and the pegs are all replaced, the whole frame is placed in the "sulphuring closet," with several others, as it would not be economical to sulphur one at a time.

The sulphuring closet is placed in a damp place, surrounded as much with water as possible. An earthen vessel, containing the sulphur, is placed in it, with the frames: the sulphur is then set on fire, and the closet well-closed in every part, to confine the fumes. When the cords have remained a sufficient time, the frames are taken out, and placed on the "refresher", and rubbed with a horse hair cloth. This done, they are again placed in the frame, twisted anew, and returned to the sulphuring closet, to undergo the same procedure as before. If the state of the atmosphere require it, the whole of these operations must be twice or thrice repeated; and they are then left to dry.

When the cord is sufficiently dry, it is known by its not running up when peg is taken out, and remaining stiff and straight, instead of flagging. If dry enough, they are well oiled with good olive oil, and coiled up into rings for sale. Their quality becomes better by preserving them for some time.

The whole success of these operations depends principally on the ability and experience of the workmen in managing the different washings, stretchings and twistings and in a judicious use of the sulphur. When the cord is too much sulphured, it readily snaps; and on the contrary, when the sulphuring is insufficient, it stretches too much, and never keeps in tune.

Film Industry in India.

EVERY educated Indian presses for the encouragement of home industries but no body up to this time has thought of the film industry.

India receives almost all pictures from abroad and a great sum of the country's money is sent out, especially to America.

The reason is that Indian Film Companies do not produce so many pictures as to control the cinema world of India. The few produced are not in a position to attract every class of people because fully 90% of Indian produced plays are religious dealing only with the Hindu Religion and Mythology, and thus they bring money only from the pockets of the Hindus.

Another reason for the discouragement of the country-made films is that the Indian producers charge too much money for their pictures and because these pictures do not pay much, therefore, the Indian exhibitors do not care to exhibit them.

The main reason why the Indian producers charge too much money is that they do not send their films outside India and they have to confine their profits to this country and thus they make the best of a bad job.

Another reason of the unpopularity of Indian pictures is that they are not so good as to attract good audience. But even there are some Indian films that are worth seeing.

There are not many film producing companies in India and those that exist are not worth calling the film companies when compared with the English or American ones.

Perhaps the best and the largest film manufacturing company in India is Madan Theatres Ltd, Calcutta. A large number of Indian film companies is situated in Bombay the INDIAN HOLLYWOOD. Kohi-noor, Bharat, Majestic and Swastika are the leading film producers in India.

Taking together all the film companies in India, they do not produce one picture per month an on average and it is a pity to call any of them a film company.

No body knows that such and such film is released or is to be released until one sees it in his or her own town.

The reason is that there is no newspaper in India dealing with the Indian film news and there is a great need of one. This is written only to tell those who are interested in Indian industries that they should give some thought to this newest of arts and thus save a good deal of our national wealth. Moreover some of the foreign films are injurious to the morality of the Indian people because "what may be merely laughable or ridiculous to the white may be harmful elsewhere and so more attention should be paid to the examination of the films from abroad that are imported into India.

—By Mr. D. D. KAPUR, (P. S. K.)
Photo-dramatist.
Gumti Bazar, Lahore.

Mica Condensers for Wireless Amateurs

I NEED not discuss here the ever-increasing interest taken in the advancement of Radio Telegraphy. The mica condenser is of some importance in experimenting on wireless. So I take this opportunity of giving the interested public a detailed description of the construction of such a condenser.

The materials required are small sheets of pure mica, some undamaged pieces of tin foil (ordinary foil used in wrapping chocolate, etc.) and some paraffin wax; A piece of ebonite, a little bigger than the size of the condenser required, would make the condenser more effecient.

First of all prepare the pieces of mica to the required size by trimming the edges neatly with a pair of scissors and also smooth the tin foil by laying it flat on a piece of marble or slate and sliding a smooth blade of a knife or by following a similar process. The tin foil should be entirely free from any minute holes or any other form of damage. Then it should be cut into strips of the same length as the piece of mica but having a smaller breadth (say by about .2 of an inch). When the above materials have been collected it is no hard task to prepare the condenser. Now melt the paraffin wax in a pan and have it nearby. Take a prepared piece of mica and paste it with melted wax in the middle of the piece of ebonite. Then take a piece of tin foil, cut into proper shape and paste it with wax in the middle of the mica disc pasted before, but leaving an extension of the tin foil outside the mica plate. Paste another mica plate over the tin foil just pasted, so that this plate may coincide with the mica formerly pasted. Over this plate paste another piece of foil also having an extension on the other side of the mica; (i. e. the two pieces of tin foil pasted alternately will have their extensions on opposite sides of the mica plate). This process of pasting mica and tin foil alternately is continued until the required capacity is obtained. With a certain kind of tin foil and mica they use 5 plates with an overlapping of 4 square inches to obtain a capacity of .006 u. f. and 3 plates with an overlapping of .5 sq. in. for a capacity of ·00025 u. f.

For a 2-valve set a condenser of the following dimensions may be used for the "Grid Leak," mica plate ¾" × 1⅜" and the tin foil 1⅜ × ·51" and a condenser for the receiver circuit may have the following: mica 1¼" × 2" tin foil 1" × 2". The number of layers may be from 5 to 10.

The condenser is finished off by placing a piece of mica on the top of the layers and by soldering two wires to the tin foil extensions to serve as the two terminals of the condenser. When this easy process is gone through the finishing touches should be given. Heat the blade of a knife or any other similar instrument and press it hard on the layers that have been pasted on the piece of ebonite. This will throw out all the surplus wax and will make the condenser neat, compact and more satisfactory.

If required this can now be enclosed in a neat box prepared for the purpose for further safety.

—By Mr. L. A. S. de Silva,
Ambalangoda, Ceylon.

Ideas for Small Capitalists.

For Self-Supporting Students.

Mr. Ambaprasad Tewari, Vakil, Ujjain C. I., sends us the following :—

In these days of commercial and industrial activities in the country merchants and industrialists of all places are required to advertise their goods by distributing hand bills, affixing posters in conspicuous places, and by stencilling on walls, etc with the help of tin plates the advertisements relating to their goods. Hand-bill distributors charge Rs. 2 to 3 per thousand and this work can be undertaken by students, in their spare time.

In order to find work of this sort they will have to advertise in some well circulated magazine and also write to the advertisers of patent medicines, novelties and other articles as it is they who distribute hand bills more than other manufacturers. It is certain that if the distribution is honestly done the advertiser will get orders and work sufficient to maintain a self-supporting student.

For Small Capitalists.

RAILWAY CLAIMS AGENCY. For persons sufficiently educated in English to correspond with Railway authorities this work may be profitably suggested. It can, of course, be undertaken in commercial centres only. The person desiring to undertake this work should hire a room for office, furnish it with office requisites. A typewriter would be welcome. The railway claims agent may get some formal letters printed leaving blanks for names of places, parties, description of claims, etc These printed letters would be, for instance, the first complaint with particulars of the claims and subsequent reminders. Queries will have to be answered by special letters, manuscript or typewritten. The railway claims agent should get copies of the rules and tariffs prevalent on different railways and should study them along with the Railway Act. He should then advertise through brokers and others and should himself see the merchants of the locality and surrounding places and secure their work if any. The agents generally charge 10 to 12 per cent on the amount of claim of which something is recovered in advance to defray expenses. He has to keep a register of all claims preferred to the different railways through him and should keep separate and complete records of each case. On preferring a claim to the railway authorities he should issue reminders from time to time in order to keep matters moving. It takes over six months and probably a full year or thereabout to get a claim settled. Till then it certain that the merchant would not give him more than the actual charges including his reasonable labour and out of pocket expenses but once he has established himself this business would be found paying. The Railway claims agent can also have sub-agents outside to secure work for him on commission. He has also to advertise in papers and by distributing hand bills in surrounding commercial places for work. The capital required in this business is not large. Besides the maintenance of himself and his dependents. Office rent, stationery and other charges for about a year will have to be borne.

ISSUING OF MARKET REPORTS. This work is very important from a business point of view and can be undertaken in big commercial centres with which are affiliated other small or less important commercial towns. The merchants in the latter place would like to keep themselves informed of the rates, prevailing in commercial centres, of the commodities in which they are interested. This report helps them in adjusting their own rates of buying and selling and in forming their own imaginations as to future bargains. The capital required for this business would consist of post cards printed with names of different articles of which rates are given or are demanded. To start with the reporter should first acquaint himself with local merchants and brokers, and also with the names of outside merchants having connection with the central market. He should try to see them personally and inform them of his work asking them to subscribe. He should send free sample reports to outside merchants whom he has not seen. He should daily send the market report to his subscribers and sample reports to those whom he wishes to subscribe to it. He has to hire a room for office near the market and with help of brokers and by other means get as accurate information as is possible for insertion in the report. Every evening after the closure of the wholesale bargains his work of filling in the reports and dospatching them commences. The report can contain the rates, the approximate qnantity of the articles that arrived in the market that day, and the future trend contemplated by the local merchants as to rates, etc.

The amount to be charged for the report should cover the cost of stationery, printing, postage and labour. It is graded just as the rates of subscription to newspapers are, i. e, the greater the period of subscription the lesser the amount charged. The report can be printed on post cards or on letter papers according to the bulk of matter reported. Before getting his forms printed the reporter has to see what articles are exported from the place, and what are imported so as to include them in his report. Rates of other articles such as shares of companies, rates of exchange of Hoondies and of Government loans and securities gold, etc. are also inserted in the report though they may not be exported.

Business of Order Supply or Mail-Order Business. This business can also be undertaken by small capitalists. The person wishing to start this business should first find out what articles can be exported from the place where he wishes to work and from the surrounding places and the quantity in which they can be had. By attending the market and the railway station he can also find out the place or places to which they are exported if exported at all. His next task is to find out customers who would purchase the article from him. In undertaking the business of order supply the supplier should engage the services of a reliable canvasser who may be travelling outside with samples and on settling his commission and other terms furnish him with samples and a printed order book for the canvasser to get orders for him. The order book contains pages in duplicate or rather triplicate for each order one of which is taken by the orderer, one retained by the canvasser and one sent to the supplier who immediately on receipt of the order supplies the goods from either his stock if he has any or by purchasing them from the bazar. The order supplier can also get orders for his goods by inserting advertisements in newspapers and periodicals. It will be useful to the order supplier to occasionally go out himself for canvassing his goods leaving his assistant behind to attend to orders. He will be able to see other places and find out what articles, if any, can be imported to his place The order supplier may not have any stock with himself, his business simply consists in showing samples and on getting an order to purchase the goods required and supply them adding his profit to the market value.

Small Trades & Recipes.

Vegetable Hair Dye.

A satisfactory vegetable hair dye is made from Henna (or Lawsonia). The recipe is :—

Powdered henna,	4	oz.
Acetic acid	240	grs.
White honey	240	,,
Powdered rhubarb	240	,,
Hot water	.	qs.

Mix well, and use enough hot water to make a paste. Apply evenly over the hair. Dry in the sunshine for two hours, and then wash thoroughly with a little ammonia in the rinsing water. Sometimes, after the dry powder is brushed out of the hair, the latter is brushed with dilute solution of ammonia, and while still damp with this it is brushed with a 2 per cent solution of potassium permanganate.

Hair Oils.

Hair oils usually consist of benzoated oil to which any desired floral odour has been added. Benzoated oil is made by digesting an ounce of bruised benzoin, Siam preferably, in a pint of almond or olive oil for three hours on a water bath, and filtering through filter paper. Oil so treated does not become rancid.

(1)

Rose.

Benzoated oil	20	oz.
Otto of rose	25	mm.

(2)

Heliotrope.

Benzoated oil	30	oz.
Heliotropin	30	drm.

Erasing Ink.

Ink may be cleanly erased with the help of the following solutions. (A) Dissolve 2 oz. of citric acid in 16 fl. oz. of water and add to it 3 fl. oz. saturated solution of borax. (B) Mix 6 oz. of chlorinated lime in 16 fl. oz. of water, shake well, and set aside for a week in a well-stoppered bottle. Then decant the clear liquid and add to it 3 fl. oz. of saturated borax solution.

For successful application proceed as follows. Saturate the ink spot with (A) solution removing excess of liquid with a clean blotter, and then apply (B) solution. When the stain has disappeared, apply blotter, and wash the spot by alternate use of clean water and blotting paper.

Cleaning Aluminium.

Discoloured aluminium may be restored to its original state by washing the utensils with a mixture of 30 gms of borax dissolved in 1000 gms of water, with a few drops of ammonia added.

Lemon Jam.

Take 7 fresh lemons, and slice very finely, remove all pith and seeds, put into preserving pan. Pour over 6 pints of cold water. Let stand all night, then boil till the fruit is soft, and 6 lbs of sugar. Boil up and cook gently for 2 to 2½ hours, or until a small quantity will go to jelly on a saucer.

SCIENTIFIC & INDUSTRIAL TOPICS.

Leather Embossing.

The embossing machine is to the tanning industry what modern methods of engraving plates are to the printing industry. The printer has his dots, lines, squares, and other designs prepared mechanically for his use, while the tanner has his leather stamped, pebbled or grained to represent various skins of animals. In either case, it would be difficult for the individual who produces the finished job to work. Without the aid of mechanical devices where would the tanner be if he were required to purchase the skins of sharks, lizards, alligators and other strange creatures, that is, strange so far as their hides are concerned ? Discriminating between such leathers as sheep, kid and calf is a task not easy. If the tanner is to gain a comprehensive grasp of the subject of embossing, he must delve into the very nature of the beasts. Cold countries produce animals with thick skins, while warmer climes usually produce a beast with a light skin. The animal from an arid area is likely to yield a dry pelt, while the animal from a country where moisture prevails is likely to yield an oily pelt. There are multitudinous distinctions in hides, yet the tanner is obliged to gain a mastery of them. As regards embossing, firm skins are best, as the designs are brought out more clearly and are held better in stock. During lasting there is less possibility of the laster pulling them out or tearing through them. Grain imperfections are hidden by the embossing. Nearly every inch of the skin, therefore, can be cut, which means greater economy in the manufacture of leather goods.

The Science and Efficacy of Lubrication.

Lubrication involves the introduction of a substance between two surfaces which has the property of holding them apart without retarding materially their freedom of motion. Modern lubrication has passed from greases and fats to liquids, and in some cases talc, graphite, and other solids have been found to possess faculties of lubrication, As a rule, it has been found that the heavier oils are more fitted for heavier work and higher heat which develops as a result of the increased friction. Thus viscous oils and even greases are found best fitted for the large, slowly moving bearings, while the non-viscous, thin, and light oils are found better fitted for the rapidly moving light bearings. Lubricants must perform the double duty of eliminating friction and abolishing heat at the same time. Modern ideas in bearing lubrication bring out the theory that the pressure of the lubricant between the bearing surfaces of a shaft and its boxing creates a *film of oil of the same thickness on all sides of the shaft.* As this shaft revolves, the inside portion of the film of oil revolves with it ; a portion of the film nearer the outside revolves with the outside portion, due to liquid friction, but the speed is not as great ; the speed of successive strata of oil decreased, as the film of oil between the shafting and boxing is examined, until the oil on the outside of the protective film is found to be practically stationary. The friction between the particles of lubricating oil is much less than that between the solid surfaces, and it is much less also when pressure lubrication gives a uniform oil film on all sides of the shaft.

The Audiometer to Measure Hearing.

The audiometer, developed by certain telephone research workers, is designed to give quantitative measurements of the acuteness and quality of hearing of either ear, much as the eyesight is tested by the oculist. The source of the sound is a vacuum-tube circuit which can be set to give a pure tone of a desired pitch within the audible range, and the person under examination listens in a telephone receiver while the intensity of the sound is varied in definite scientific units by the operator. The points at which the sound is no longer perceived is recorded as the examinee's limit of hearing. It is expected that tests with this instrument will soon lead to better aids for impared hearing, and that further improvement may result from the continued studies in telephony. Besides giving hope of relief to those hard of hearing, the audiometer will find other useful applications. It may aid in delicate diagnosis of ear troubles, in determining the fitness of applicants for insurance, automobile license or army or railway service, and specially in schools as a guide to early treatment, or to special training for children with permanently defective hearing.

The Physics of Speech and Hearing.

Human speech employs frequencies from 60 to above 6000 per second, a range of about six octaves, The ear can perceive sound waves ranging in pressure amplitude from less than one-thousandth of a dyne (per sq. cm) to over 1000 dynes and in frequency of vibration from about 20 to about 20,000 per second, a range of about ten octaves. The intensities and frequencies used most in conversation are those situated in the central part of the area of audition. The energy of speech is carried largely by frequencies below a thousand per second, but the characteristics which make it intelligible, largely by frequencies above a thousand. Under quiet conditions good understanding is possible with undistorted speech having an intensity anywhere from one hundred times greater, to a million times less than at exit from the mouth.

Romance of Footwear.

From the earliest times the primary function of the boot and shoe was to protect the feet against injury in wear, and to ward off danger to health by ensuring that this part of the human anatomy was not subjected to chills and wet. The original idea still prevails to a large extent but footwear has always in a minor degree been a factor in the decoration of humanity. The ancient Egyptians seem to have been, for instance, rather artistic sandal makers, as there are tomb hieroglyphics showing a style of foot covering which was certainly designed for ornamentation, and which probably gave wearers as much acute discomfort as the so-called "smart" shoes favoured by some of our ancient and modern flappers ! Even the old military Romans do not seem to have been above this sort of vanity, for there are frescoes still extant which show the designers thought more of ornament than utility.

India-Rubber.

India-rubber, one of the most important industrial raw materials, as it serves for the production of a great variety of most useful things, is a natural vegetable product, which is not obtained direct from the plant as for instance resin, but is prepared from the milky sap of certain trees and bushes, called caoutchouc plants. These plants thrive only in a zone which extends 30 degrees north and south of the equator and comprises Africa, the Malay Archipelago, Central and South America (especially Brazil), Arabia, India, the Indian Isles and North Australia. India-rubber as it appears in the market is almost throughout derived from the following four groups of plants : (1) the Euphorbiaceae, which produce the famous Para rubber (country about the River Amazons) ; (2) the Apocynaceae which flourish in East and South-East Brazil and the Congo district ; (3) the Ascleopiadeae of Madagascar ; (4) the Moraceae which thrive in South Mexico, the remaining Central America, Columbia, Ecuador and Peru. Originally, nearly all the rubber was obtained from wild growing trees and bushes, but about the seventies of last century the regular cultivation of these plants on carefully planned plantations was begun and therewith the systematic production of India-rubber. The method is generally as follows. The plants are tapped by means of various cuts, as for instance the fish-bone cut, the V-cut near the base, the Kelway-Bamber tapping-method, etc. As soon as the cuts are made the cells below the bark begin to discharge their sap which runs along a common longitudinal cut and is collected in a vessel suspended at the lower end of the cut. The sap is rather thick, of a creamy consistence although very liquid and is of a whitish or yellowish colour. In addition to India-rubber this sap also contains water, resins, gums, salts, albumina, alkaloids, oils and acids. After collection the sap is caused to coagulate by the addition of acids (acetic or carbonic acid) whereby India-rubber is separated. The quantity of rubber contained in the sap depends on the age of the plants, the condition of the soil, the climate, the methods of cultivation, etc.

FORMULAS, PROCESSES & ANSWER

Preparation of Papain.

2719 S. B., Mandalay. Asks how papain is prepared.

Papain is a proteolytic or digestive enzyme contained in the juice of the fruit and other parts of the Papaya tree (*carica papaya*). The commercial product, which consists of a cream coloured or white powder is obtained from the fruit of the tree.

The juice, which contains the papain is obtained by making shallow longitudinal incisions, about ⅛ inch deep, in the unripe but well-grown fruits. by means of a non-metallic knife, such as a bone or ebonite knife.

Fruits in which only three to four incisions are made simultaneously,. can be incised again after a day or two. The juice resembles a white thin sticky latex, which coagulates rapidly.

The fruits should be incised in the early morning and the juice strained through muslin and dried at about 35° C. for two days, when it forms a cream coloured brittle mass with an unpleasant odour. The mass can be ground to a powder.

The juice should be collected in glazed earthen-ware and a trace of formalin added to the juice which will prevent decomposition. Small quantities of juice may be dried in the sun on sheets of glass. Large quantities however are prepared preferably by spreading the juice on linen trays made by stretching brown linen on wooden frames placed over a hot air chamber of brick, avoiding excessive heat. For this purpose an iron plate covered with 2 to 3 inches of sand between the fire and the hot air chamber, may be used with the trays about one-foot above the plate. Artificial drying in this way should be done below 100° C. on a large scale however, vacuum drying would be found to be very efficient. The juice contracts on drying and the contents of several trays can be placed subsequently in one to complete the drying. The juice should be dried till it is crisp and capable of being reduced to a powder. A cream coloured or white powder is obtained. The yield of crude dried material amounts to about 16 to 18 per cent of the weight of the juice.

Food Value of Butter.

1972 A. B. H., Calcutta. Wants to know the food value of butter.

Butter is one of the most important sources of fat in human diet, and one of the most palatable and easily digested. Its flavour depends more upon the fermentation and chemical changes that have taken place in the cream before churning than upon the fat itself. However, butyrin, the characteristic fat of butter, imparts to good butter a peculiar and desirable flavour.

Butter is made up of a relatively large percentage of fats having a low melting point. Butter-fat globules are very minute in size, and hence are readily emulsified, digested and absorbed. Because of its low melting point and its physical condition, butter is more easily digested than other animal fats.

It is recommended by some physicians as a tonic instead of cod liver oil or similar preparations.

Silajatu—its Source and Uses.

2726 C. T. B., Agra Desires to know the source and uses of silajatu.

Silajatu is a bituminous exudation of some rocks during hot season. It has four varieties inasmuch as it has gold, silver, copper or iron in its composition. The gold silajatu is red, the argentine variety is white, the coppery is of variegated hue like the throat of the peacock and iron silajatu is blackish. The last variety is best for medicinal purposes. It is acrid and bitter in taste, stimulant tonic, and alleviative of phlegm, obesity, oedema, dropsy, phthisis, consumption, gravel, strangury, intestinal worms and leprosy. Before entering into medicinal composition it is required to undergo necessary purification.

To Take Impressions of Leaves.

2692 P. K. R., Raigarh. Request us to publish the process of taking impressing of leaves on paper and silk.

(1) On Paper.

A very beautiful and economical way of taking impressions of leaves is to take a small quantity of potassium bichromate; dissolve it in a saucerful of water, and pass the paper on which the impressions are to be taken through the solution; while wet press the leaves lightly upon it, and expose it to the mid day sun. When perfectly dry, remove the leaves, and a perfect facsimile will remain in light lemon shades while the rest of the paper will be of a dark brown tint.

(2) On Silk etc.

Prepare two rubbers by tying up wool, or any other substance, in wash-leather; then rub up with cold drawn linseed oil the wished for colours, as indigo for blue, chrome for yellow, etc; dip the rubbers into the paint, and rub them one over the other, so that too much may not remain upon them; place a leaf on one of the rubbers and damp it with the other; take the leaf off and apply it to the silk, satin, paper, or other substance which is required to be stamped: Place a piece of paper on the leaf, and rub it gently, and there will be a beautiful impression of all the veins. Leaves can be used only once.

Aniline Salt.

2659 A. K. D., Calcutta. Writes, what is aniline salt?

Aniline, being a basic compound, is capable of producing salts; one of the most important is Aniline Salt or aniline hydrochloride. It is obtained by mixing aniline with concentrated hydrochloric acid in molecular proportions and then allowing the aniline salt to crystallise out.

Source and Uses of Asafetida.

1943 P. C. B., Calcutta. Enquires of us for the source and uses of asafetida.

Asafetida is a gum resin of very variable appearance and purity obtained from species of Ferula, growing in Afganisthan. The Karan and Chagai districts are the chief collecting districts, the gum-resin being a dried exudation from schizogenous cavities which appear as the plant becomes mature. The method of extraction consists of protecting the plant by a small hut of stones, and when it ripens an incision is made in the stem. The exuded milky sap is collected in skins and dried in the sun. Collection begins in April and May and continues the greater part of the summer during which three or four gatherings from fresh incisions are made. The yield from one stalk is about one pound but varies from a few ounces to two pounds, according to the size of plant. The first exudate is considered of superior quality. The Afganisthan product, which is known in the Bombay market as "Hingra", is derived chiefly from Ferula foetida, but another kind, known as "Hing" is obtained from Ferula alleacea. Nearly all the asafetida is consumed in India as a food condiment; only 5 per cent being exported.

Good asafetida is dull cream or yellow in appearance externally, but the tears are often translucent internally and turn pink on exposure to air. The fresh surface turns green when touched with nitric acid diluted with equal volume of water. Its alliceous penetrating odour is also distinctive. Commercial asafedita varies greatly in appearance, even in the same case. Some can be separated into tears nearly white or cream in colour, other portions consist of pink or red pasty "blocky" gum in which outlines of original tears can be seen. Low grade asafetida consists of hard dry lumps, brown or black in colour. Comparatively little asafetida is used medicinally much more being used as condiment.

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Manufacture of Potassium Dichromate.

2621 Roll No. 20368, Trivandrum. Writes please describe the method of manufacturing potassium dichromate on a large scale.

In the manufacture of potassium dichromate the chrome iron ore (or chromite) furnishes the basic material. The ore is finely pulverized and mixed with lime and sodium carbonate. A small amount of calcium carbonate is usually added, as the carbon dioxide liberated renders the mass porous. This mixture is heated in a reverberatory furnace in the presence of a strong current of air. At the end of the reaction the mass consists of a mixture of calcium chromate, sodium carbonate and ferric oxide, which being lixiviated, yields sodium chromate, insoluble calcium carbonate and ferric oxide. The solution is neutralized with sulphuric acid, which precipitates the alumina and silica. It is then filtered and evaporated. When the concentration reaches a specific gravity of 56°Be. the requisite amount of sulphuric acid is added, converting the chromate to dichromate. Most of the sodium sulphate is precipitated by this treatment and may be separated by filtration. The solution is then concentrated to 60°Be when more sodium sulphate separates, and on allowing it to stand the sodium dichromate crystallizes. From this sodium dichromate the potassium salt is obtained by double decomposition by treatment with potassium carbonate.

All about Orchids.

2732 C. M., Aijal. Wants to learn about Orchids.

The cultivation of orchids affords one of the most interesting and pleasant occupations. The plant of this extensive genus are properly divided into two classes, namely. *Epinhytes*, or orchids which grow on trees, and *Terrestrial*, or those which grow on the ground orchids are very beautiful, but singular in appearance, both as regards leaves and flowers, and in many individuals peculiar in habit and manner of growth. It has been observed that the more tender sorts are the most curious and beautiful.

In order to grow orchids successfully it is essential to know which of these types they belong, also the elevation and conditions of climate under which they grow in their natural state. Nevertheless orchids like other plants are adaptable to altered conditions.

Special kinds of pots with several drainage holes and perforated sides are made for growing orchids in. For epiphytes a potting material consisting of old bark, broken crocks or pieces of porous brick, and sphagnum moss is essential. Coir fibre, which should be well-bleached, is a most serviceable material employed for growing epiphytic orchids, and is indispensable for fixing them on boards, stems of trees, etc. It is also used in composts for terrestrial orchids.

Blasting Explosives.

2231 S. S., Chhindwara. Asks can you throw some hints on the preparation of stong gun-powder for blasting purposes ?

For blasting hard rock a powerful and brisant explosive is required, more especially in operations such as tunnelling, where it is not required to obtain the material in large pieces. Softer minerals require a slower burning explosive, as otherwise they are shattered too much and excessive amounts of dust are produced. For this reason and on account of its cheapness, gun-powder is still extensively used for quarring. For work in coal mines a mild explosive is required for coal getting in order that the material shall not be unduly shattered, and a more brisant explosive for ripping and clearing away stone. At the same time the explosive used must not fire the mine gases nor cause a coal-dust explosion. For use in wet situations a satisfactory blasting explosive should not be readily spoiled by water although this trouble can be largely got over by using water-proof wrappers. Finally, as blasting explosives are largely used by ignorant people, they should be as fool-proof as possible.

A general composition for blasting powder is saltpetre 75 per cent, sulphur 10 per cent, charcoal 15 per cent. But the proportion varies considerably as the following table will show.

Powder	Saltpetre	Sulphur	Charcoal
Ordinary	62	20	18
Slow	40	30	30
Strong	62	13	15

Polishing Brass.

2642 B. L. K. L., Ambala, Asks how brass is polished.

A polishing paste for brass is prepared as follows :—

	By parts
Oxalic acid	3
Water	40
Pumice stone	100
Turpentine	2
Soft Soap	12
Neatsfoot oil	12

Dissolve the oxalic acid in hot water and gradually add the other ingredients.

Brass can be kept unturnished only by polishing the same regularly.

Wood Staining

2404 N. S., Hura, Requests us to throw some hints on wood staining.

The art of wood-staining may be conveniently divided into three types :(1) The staining of dial or common woods to match the better class such as ebony, walnut, rosewood, mahogany, etc. (2) The darkening of natural wood to imitate a superior class : as, for example, common oak to match, brown or pollard oak, common bay wood [illegible]tch best mahogny (3) Decorati[illegible]rk, such as the imitation of in[illegible]rk etc.

Two methods of staining are in vogue :—(1) Surface-staining, this staining is effected by pigments being laid upon the surface like paint. The thick opaque coating formed does not penetrate the fibre of the wood. (2) Body-staining. In this the stain is usually applied as a thin wash. It enters the pores of the wood, and colours it to some little depth below the surface For ordinary purposes the second method is quite sufficient.

Artificial Dyestuffs.

2667 G. T. K., Ratnagiri. Request us to differentiate between the various artificial dyestuffs.

(1) ALIZARIN DYES. The name Alizarin is primarily applied to the chief colouring principle of maddet. It is extended to several closely related artificial dyes, one of which is indentical with natural alizarin It is now employed generally to designate a large and important group of dyes of varied hue mostly derivatives of anthracene.

This group of artificial products now includes dyestuffs yielding an almost complete range of shades As a class, the alizarin dyes are more closely related to the natural dye-woods than are other groups of coaltar colours. It may be noted here that anthracene, the raw material of the manufacture of the class of dyestuff exists in considerable quantities in coaltar.

(2) COALTAR COLOURS. It is well known that during the dry distillation of coaltar the most valuable bye product obtained is coal tar. By distillation and chemical treatment various products are obtained from coal-

tar, and the following are those of chief importance in the colour industry, viz, Benzene, Phenol, Naphthalene, Anthracene. Each of these substances is the basis of the manufacture of a large series of dyes.

There are at the present time about 2000 distinct coaltar colours offered for practical use; and they may be classified according to their source of origin: (a) Aniline dyes or benzene derivatives, (b) Naphthalene dyes, (c) Anthracene dyes, (d) Derivatives of phenol, etc.

It will thus be clear from the above that aniline dyes and alizarine dyes are respectively derived from benzene and anthracene which in their turn are both bye products of coaltar distillation.

Chalks of Different Names.

2667 The same gentleman writes, "Please distinguish between chalk, French chalk, whiting and precipitated chalk."

"Chalk" is a white or greyish, loosely coherent kind of limestone rock mainly calcium carbonate.

"French chalk" is nothing but steatite, soapstone or talc.

"Whiting" is prepared by grinding chalk and collecting the finer sediment from water; this is used for polishing, making putty and many other purposes.

"Precipitated chalk" is obtained by the double decomposition of sodium carbonate with calcium chloride. The precipitate is an extremely fine powder. This is largely used in tooth powders and similar preparations.

Garlic Oils.

2713 K. S. B., Karnal, Wants to learn the preparation and uses of garlic oil.

Upon distillation of the entire garlic plant a volatile oil is obtained which has a yellow colour and possesses an intense and very unpleasant garlic odour. Inasmuch as the oil is decomposed by distillation under ordinary pressure it had to be distilled under diminished pressure. The oil of garlic proper can only be obtained by the distillation of garlic bulbs in vacuum. The impure oil has an exceedingly pungent odour and a strong acrid taste, and when applied to the skin, produces much irritation and sometimes blisters. It may be purified by repeated distillation in a salt water bath, and is then decomposed by boiling.

The use of garlic as a medicine and as a condiment can be traced to earliest antiquity. When taken internally, and even when applied externally, the oil is absorbed and imparts its odour to the breath, urine, perspiration, etc. The The oil of garlic has some influence upon the human system as a general mild stimulant. Its chief value in medicine is for its local action upon the stomach and as a stimulant expectorant. The oil may often be given with advantage in cases of bronchitis. It is specially valuable in the treatment of children when there is a distinct nervous element. Garlic oil is sometimes employed as a rubefacient, carminative and condiment. Latterly it has found application in consumptive cases through injection.

Californian Drying.

2703 B. R., Rewari. Wants to learn the Californian process of drying fruits and vegetables.

Drying of foods is one of Nature's own process in certain well-known cases such as "grain". But Nature's methods have been improved upon by the application of artificial heat, which hastens the process. This is used to dry perishable products which under natural conditions could not be kept. The comparative merits of the open-air "drying" and the indoor 'evaporating" processes hinge entirely upon the matter of climate. In California open-air drying is almost universally practised, as the sections where fruit is dried are practically free from excessive moisture and rain during the entire drying season. In other parts of the United States the evaporating process has however superseded open-air drying for commercial purposes.

The simple method of exposure to sunlight is practised in California. The fruit is cleaned, cut, then placed outside upon wooden trays, about three by seven feet in size, sterilized with sulphur fumes, and placod in the sunlight for five days, or until sufficiently dry.

Artificial Ivory.

2704 G. B. K., Shegaon. Wants a recipe for making artificial ivory.

Dissolve 2 parts of caoutchouc in 36 parts of chloroform, and saturate solution with pure gaseous ammonia. Distil off the chloroform at a temperature of 85°C. Mix the residue with phosphate of lime or carbonate of zinc. Press it into moulds and dry. Any desired shape may thus be obtained. When phosphate of lime is used the product possesses, to a considerable degree, the nature and composition of ivory.

Uses of Ivory.

2716 P. S., Homalin. Wants to know the uses of ivory.

Ivory has been used for ornamental works from the earliest periods. The ivory statues of the ancients appear to have been formed upon centres, or cores of wood covered with plates of ivory.

Latterly ivory has been extensively employed by the miniature painter; it is used by the turner in the manufacture of numberless useful and ornamental articles; the cutler makes his best knife-handles from it; and the scientific instrument maker constructs his scales from this material.

In India exquisite ivory carving is carried on in Mysore and Murshidabad. The many objects of art produced are not only captivating but are also invaluable.

Bleaching Shellac.

2701 M. C., Peshawar. Wants a process of bleaching shellac.

Mix 1 part of chloride of lime with 4 parts of water. Dissolve 1 part of potassium carbonate in 3 parts of water. Run the latter into the form so long as a precipitate is formed. Filter the liquid and add, a little at a time, a solution of 1 part of orange shellac in 4 parts of alcohol (90 p. c.). Stir well and allow to stand in the sun. After half an hour, run the liquid containing the resin in a thin stream into dilute hydrochloric acid. When the resin is completely precipitated wash it in water until free from acid. Churn it with hot water until the latter is no longer coloured. Finally run the hot resin into sticks and pile them together.

Artificial Slate.

2284 Roll 14429. Asks, How to prepare artificial slate without slate powder?

An artificial slate may be prepared by boiling together 10 oz. of cotton seed oil, 8 oz. fine lampblack and 5 lb. sifted sand.

This composition is painted over card-board using spirit of turpentine as a vehicle and applying 2 or 3 coats. The surface is finally rubbed smooth with a rag soaked in turpentine.

Dyeing Mother-of-Pearl.

2574 K. D. T., Tatta. Requires some hints on the dyeing of mother-of-pearl articles..

Mother-of-pearl articles are made from sea mollusks and it is often required to dye them. For this purpose the basic dyes are mostly employed, and the dyeing is done either in an alcoholic solution or in a water solution to which an equal volume of alcohol is added. For the alcoholic liquor penetrates the mother-of-pearl material and stains it better than water alone. Before dyeing the articles are prepared by steeping them in a solution of potassium carbonate at about 120°F. They are next washed well and dried. The articles are then dyed by steeping them in the colour solution for several hours or until the desired shade is obtained. After dyeing the articles are rinsed well in cold water and dried slowly to prevent cracking.

Gilding on Wood.

2727 B. K. M., Birbhum. Asks, How to effect gilding on wood?

The general process of gilding is as follows. A gold leaf is taken from the book, laid on the pad, blown flat and smooth by puffs from the mouth and then cut to shape for the surface to be gilded, allowing a small surplus margin. The shaped leaf is removed from the pad by the aid of the tip.

The surface to be gilded must be previously sized; sufficient time being allowed for the size to dry to the correct degree. The shaped leaves, are then laid all over the sized surface. The whole gilded surface is gently pressed with the bob, to ensure its complete adhesion, The gilded surface is gently brushed and painted over with a clear size.

The above general process undergoes modification in its application to (1) plain wood and (2) polished wood. (1) Before gilding plain wood, its absorbent character must be destroyed by the application of a ground colour. A compound of boiled linseed oil and white lead will serve the purpose. The painted ground, when dry is rubbed down smooth with fine glass paper. (2) In the case of polished wood, the coat of polish serves the purpose of a ground colour, and renders the latter needless. The sizing and gilding are conducted on these prepared surfaces in the usual way.

Mother-of-Pearl.

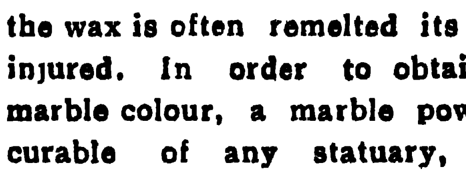
2574 K. D. T., Tatta. Wants to know the uses and source of mother-of-pearl.

Mother-of-pearl is the hard, silvery, brilliant internal layer of several kinds of shells, particularly oysters, which is often variegated with changing purple and azure colours. The large oysters of the Indian seas alone secrete this coat of sufficient thickness to render their shells available to the purposes of manufacturers. The genus of shell fish called *pentadinae* furnishes the finest pearls, as well as mother-of-pearl ; it is found in greatest perfection round the coasts of Ceylon, near Ormus in the Persian Gulf, at Cape Comorin, and among some of the Australian Seas. The brilliant hues of mother-of-pearl do not depend upon the nature of the substance, but upon its structure, the microscopic wrinkles or furrows which run across the surface of every slice acting upon the reflected light in such a way as to produce the chromatic effect. Mother-of-pearl is very delicate to work, but it may be fashioned by saws, files, and drills, with the aid of a corrosive acid. It is used for buttons, handles, inlays, and countless articles of ornaments. There are several commercial varieties ; the white, which comes from [illegible] and Singapore ; the yellow edge, from Manilla ; a very pure white from Bombay and South America, and the black from the South Sea Islands.

Casting in Wax.

2758 K. K. N., Surat. Desires to be enlightened on casting in wax.

To cast in wax, a mould is first made in plaster ; but before being used is placed in warm water, of which it is allowed to absorb as much as it will take—oil not being used in this process. The surface must then be allowed to dry, or the wax would not adhere closely. Pure wax is too greasy for the purpose and bladder flake white is therefore mixed with it. The quantity cannot be stated but the addition of too much gives wax the appearance of plaster, by taking away its richness. If the wax is often remelted its colour is injured. In order to obtain a gray marble colour, a marble powder, procurable of any statuary, is mixed with the wax which not only gives a beautiful appearance to it but renders it more durable. The wax is poured into the mould and allowed to flow over its surface and by moistening the plaster mould in water when the wax has become hard, the cast is easily removed. Wax models may be fastened by means of boiled linseed oil and flake white and also by a combination of beeswax and resin.



Apply to the chief Agent and consulting Match expert.
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42, Beniapukur Road, Calcutta.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of INDUSTRY are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

2279 D. R. Pithapuram. Further particulars about the ice making machine are not available.

2281 V. M. R, Ramnad. Write to the party with whom you want to correspond by number and initials under care of INDUSTRY when your letters will be duly redirected.

2282 S. S, Hoshiarpur. Sarsoon oil is rarely used in the manufacture of hair oil: use animal charcoal to purify it.

2285 K. L. D, Bombay. Please repeat your queries as the previous letter you mention is not traceable.

2286 G. D. S., Amritsar. For books on starch manufacture you are referred to Messrs Chakraverty Chatterjee & Co., 15, College Square, Calcutta. You may consult Modern Chemistry and Chemical Industry of Starch and Cellulose by T. Chaudhuri. You may also consult Indigenous Drug Industry by Dr. J. C. Ghosh to be had of the author at 30-2, Doctor's Lane, Entally, Calcutta.

2287 D. R, Sikkim State Beeswax was quoted on 24th December at Rs. 58 to Rs. 70 per md.

2289 J. A. S, Karaikal. To secure agency please look up to the Sale & Exchange Column of INDUSTRY.

2290 M. S. S., Firozabad. Please inform whether you want plate glass or glass phials. Plate glass however may be bought of Fatik Ch. Seal, 10 Swallow Lane, Calcutta while glass phials may be had of Calcutta Glass and Silicate Works, Belgachia, Calcutta.

2293 N. T., Madras. For particulars write to advertisers.

2296 P. C., Raigarh. Wants to be introduced to dealers in cardboard boxes, wooden board boxes, planks, tools, etc. of Delhi City.

2298 I. B. S., Khanganj. To exterminate ants sprinkle pulverised borax in places these frequent or spread carbolic acid around the edges of the shelves and wherever these seem to come from. Woollen shirts as you mean are sold in public auctions or by tender system, notices for which appear duly in papers.

2300 G. R. U, Indore. Ask your friend to apply to Service Securing Agencies. He may also apply for vacancies as advertised in the daily or weekly papers.

2301 K. P G, Hubli. For information regarding industrial books enquire of Chackraverty Chatterjee & Co. Ltd, 15, College Square. Thacker Spink & Co., 3, Esplanade East; both of Calcutta.

2303 T. V., Masulipatam. Gunnies may be supplied by Adamji Dawood & Co. Ltd., 55, Canning Street and Bird & Co., Chartered Bank Bldgs., Clive Street; both of Calcutta.

2304 M. A. R., Kymore. Two articles on cement manufacture appeared in October and November issues of 1921. Cement is manufactured by Bundi Portland Cement Ltd, Killick Bldg. Home Street, Fort, Bombay; Turner Hoore & Co. Ltd., Parel, Bombay; Cyril Thompson & Co., 1, Mangoe Lane, Calcutta; Reliance Trading & Agency Co., 2, British Indian Street, Calcutta; James Currie & Co., Chandni Chowk, Delhi; Pooran Chand & Co, Belanganj, Agra and Green Island Cement Co. Ld., Munnie's Bldgs., Shafraz Road, Rangoon.

2307 G. K. G. Dighirpar. Tin plates may be had of Fatic Chand Seal, 10, Swallow Lane, Calcutta. Corrugated tins may be supplied by Anandji Haridas, 20, Darmahatta St., Calcutta.

2308 D. N., Calcutta. Wants to know the rules and regulations of membership of Doctor's Association of London, U. S. A., and Germany. You are referred to our advertisement columns where you will find a list of firms manufacturing ink and other tablets. Write them direct.

2310 S. A. N., Salem. In black-dyeing the use of aluminium acetate as a mordant together with iron salt prevents the reddish appearance which is frequently produced when iron alone is employed.

2312 S. R., Bangalore, For metal engraving enquire of Commercial Metal Works, 83 & 158, Harish Mukherjee Road ; National Engineering Co., 72, Manosatolla Lane, and Roy Brothers, 86, Harrison Road ; all of Calcutta. For forwarding goods you may write to Asian Transit Co., 72, Apollo Street, and Cowasjee & Co., 148, Frere Road, Fort ; both of Bombay. The duty charged on medicine is 15 per cent. *ad valorem*. One gold mark equals 1 shilling. The American cross rate was Rs. 283 per $100 on the 23rd December. Allopathic medicines may be had of Martin & Harris, 8, Waterloo Street ; B. K. Paul & Co., 1-3, Bonfields Lane and Smith Stanistreet & Co., Dalhousie Square ; all of Calcutta.

2313 M. J. U. K. B., Agra. Fire works may be had of Orient Fire Works, 85-1, Upper Circular Road and Bonbonier, P. O , Box 10827 ; both of Calcutta. Electrical goods may be had of Mc. Lawrie & Co , 17, Ezra Street ; Deva Datta Sâragi & Son, 13, Pollock Street and English Electric Co., 4, Clive Bldgs., Clive Street ; all of Calcutta. Export of peacock's feather is prohibited under customs regulation. An article on enamelling sign plates appeared in March 1923 issue. Patent medicines are imported by Messrs Martin & Harris, 8, Waterloo Street, Calcutta. German goods are stocked by Singh Sarcar & Co., 125, Harrison Road, Calcutta. For cigarettes of required brand enquire of Messrs Karim Bux & Elahi Bux Bros., 58-4, Canning Street, Calcutta.

2315 C. R. S., Hardoi. Wants to be in touch with dealers in crude oil.

2316 B. K. C., Hoshangabad. Your query is outside the scope of INDUSTRY.

2319 S. L., Sialkot City. Forecasts of wheat, jute, cotton, linseed, etc. appear regularly in the columns of COMMERCIAL INDIA, the sister journal of INDUSTRY.

2320 M. R. B., Shivrajpur. For repairing your cycle write to S. N. Bhattacharjee 5, Dharamtolla Street, Calcutta.

2322 D. U. M., Surat. Desires to sell 13th and 14th volumes of INDUSTRY.

2323 B. B. S. K , Karachi. You may refer your query to the Philatelic Society of India, 15, Burrows Street, Bombay.

2324 S. C. S., Agra. Vide No. 2313.

2325 Roll No. 14429. Can" buy slate stone.

2326 K. V., Khamgaon. An article on boot polish appeared in June, 1923 issue.

2327 M. L. B., Bundi. ½ lb. of gum tragacanth will suffice for the recipe given. But you must mix the gum in powdered form.

2328 G. R. B., Ajmer. For repairing your filter write to Dass & Co., 60, Sikdar Bagan Street, Calcutta.

2329 K. M. D., Balasore. No such address is known to us.

2330 M. N., Lahore. Candle making apparatus may be had of Calcutta Industries Ltd., 71, Canning Street, Calcutta. An article on candle making appeared in December, 1922 issue.

2331 K. M. K. M., Karur. Tin boxes may be had of Gajanand Rampertap & Co., 6, Halsi Bagan Road, Calcutta.

2333 S. M. A. S., Nagina. Oil mills may be had of Burn & Co., 7, Hastings Street, Calcutta and Oriental Machinery Supply Agency Ltd., 20-1, Lall Bazar Street, Calcutta. You need not clarify the oils before marketing them. Wants to know the full address of Fpaff & Durkop, manufacturers of German sewing machine.

2334 D. R. S., Calcutta. You may write to International Correspondence Schools, Box 3995, Seranton, Pennsylvania, U. S. A.

2335 B. J., Larkana. You may use resin for more lather in your soap.

2336 R. S. B., Gurukul. Please explain what kind of wood working business you intend to start.

2337 K. N. K. C., Hindupur. You may write to Bengal Miscellany Ltd., 99, Manicktola Main Road, Calcutta for catalogues.

2338 G. P. V., Harda. Chemicals for match making may be had of Calcutta Chemical Co. Ltd., 35-1, Panditia Road, Ballygunge, Calcutta. Gum arabic may be had of Bansidhar Dutt, 126, Khengraputty, Calcutta. Glue also may be bought of the above firm. For expert advice on match manufacture write to Mr. A. P. Ghosh, 42 Beniapukur Road, Entally, Calcutta. Wants to buy match splints and veneers.

2339 A. V. M. S., Baruala. You may refer your query to any banking concern such as Netherlandsche Handel-Maatschappy, 29, Strand Road and The Central Bank of India Ltd., 100, Clive Street ; both of Calcutta.

2340 A. A. K., Furrakhabad. Wants to be put in touch with dealers in feather.

2341 G. D. V., Goa. One firm scarcely deals in all sorts of rolled gold articles. For required articles you are to write to the respective dealers. You may also go through the advertising pages of INDUSTRY.

2342 P. G. F., Tenali. Amber may be supplied by Messrs B. K. Paul & Co., 1-3 Bonfields Lane, Calcutta.

2343 A. K., Roorkee. An industrial exhibition is going to be held at Delhi during the early part of the next year. Process of gilding book edges appeared in October 1923 issue. Other query is outside the scope of INDUSTRY.

2345 R. D. B. C., Rajgram. Can supply tassar silk.

2346 K. B. R., Salur. For details regarding hair oil manufacture please go through Hair Oil Manufacture published from this office wherein you will find everything you require. For preparing perfumes please go through September 1924 issue. Formula of preparing saccharin appeared in Novem-1924 issue. Corks and bottles may be had of S. K. Dey, 114. Sova Bazar Street, and Satya Charan Paul & Sons, 194, Old China Bazar Street ; both of Calcutta. Perfumes and essential oils may be bought of Sikri & Co., 55-8, Canning Street, Calcutta and D. G. Gore & Co., Sayana Bldg., Lohar Street, Bpmbay. Capsules may be supplied by B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. Cardboard boxes may be had of Messrs H. L. Sett & Sons, 8, Nilmoney Mitter Street ; Calcutta Fine Art Cottage, 76, Dharamtola Street and Kundu & Dass, 20, Gour Laha Street ; all of Calcutta. For label printing write to The Indian Litho & Tin Printing Works, 1-2, Machua Bazar Street, Calcutta. To dispose of your books advertise in some widely circulated paper like INDUSTRY.

2347 S. M. A. S., Nagina. The reply to your first letter was sent on 11th September. After your complaint of non-receipt of a reply a duplicate of the first letter was posted on 24th October.

2348 U. N. P., Badanpurghat. Wants to be introduced to the exporters of paddy, cane, mother-of-pearls, bones, nuxvemica, elephant's bone and teeth

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One lb bottle Re. 1-12, one oz bottle As. 4.
Discount on Big orders. Postage & packing extra.
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Bombay 4.

and tea. For myrobalans, turmeric and oil cakes write to Jogindra Chandra Dass, 54, Canning Street, Calcutta. *Kuchila, devaraj,* honey, betelnut and resin may be supplied by Banshidhar Dutt, 126, Kheagraputty, Calcutta. Timber used for packing purposes may be had of Ramchandra Tatt, 10, Ramkrishnapur Ghat, Howrah Road, Howrah. Aluminium is not manufactured in India. Corrugated tin sheets may be bought of Anandji Haridas, 20, Darmahatta Street and Balmer Lawrie & Co, 103, Clive Street; both of Calcutta.

2349 T. K. R., Masulipatam. Can supply castor seed, gingelly seed, turmeric, chillies and coriander.

2350 K. W., Gwalior. Your enquiry being in the nature of an advertisement should not be published in Trade Enquiry Columns of INDUSTRY.

2352 R. C. C. S., Begampur. Soda ash of required strength may be had of Calcutta Chemical Co. Ltd. Panditia Rd Ballygunge; B. K. Paul & Co., 1 & 3, Bonfield's Lane; Bengal Acid Mfg. Co, 30, Bagmari Road; all of Calcutta. Cigarettes may be had of S. A. Khalique & Co., 11, Colootola Street; Imperial Tobacco Co. of India Ltd., National Bank Bldg., 5, Fairlie Place and Karim Bux & Elahie Bux Bros., 58-4, Canning Street; all of Calcutta.

2353 M. A. B. Coimbatore Tea may be supplied by Bhattacheryya & Co., 64-1, Cornwallis Street; Mukherjee Bros., 17-19, Shambazar Bridge Road and Boloma Tea Co., 226B, Bowbazar Street; all of Calcutta. Matches may be had of H. Rashid & Co, 15, Zakariah Street and F. P. Nalladaroot & Co., 55, Canning Street; both of Calcutta. For cigars see above.

2354 A. S., Agra. Calcined magnesia may be had of D. Waldie & Co. Ltd, Konnagar, Howrah and Smith Stanistreet & Co. Ltd, 9, Dalhousie Square; both of Calcutta.

2357 N. B, Funi. Fine Arts Exhibition will be held during the first week of January at Calcutta. For patriculars write to the Principal, Government Art School, Park Street, Calcutta. Colours may be had of Hansraj Vishram 13, Joseph Lane and Amin Chand Mehta & Sons, 34, Armenian Street; both of Calcutta. For brushes used in painting enquire at any stationery shop.

2358 M. T. N, Bangalore City. Arhar chuni means bran of arhar peas which is left after making pulse from arhar peas. The vernacular equivalents of arhar are, *gella-moth, togari, Kandlu, thor, tur* and *rahar.*

2359 F. D., Multan. Please go though the New Idea Prize Notice appearing elsewhere in this issue.

2360 B. S. R., Cuttack. You may write to the Registrar, Calcutta University, College Street, Calcutta for particulars regarding Ph. D. degree examination.

2361 J. N. B, Kharagpur. Take eosin 4 parts: sugar 4 parts, dextrine 1 part. Mix thoroughly and make tablet by a tablet making machine. The tablet when dissolved in water will produce a good red ink. Take finely powdered gallnuts 20; sulphide of zinc 4 oz.; sulphate of iron 8 oz; gum arabic 2 oz.; powder each separately, sift through a cloth and then weigh out and mix. Then proceed as before. Powder the ingredients mentioned in the recipes of sachet powder, mix thoroughly and use. An article on the manufacture of boot polish appeared in June 1923 issue where you will find a good number of practicable formulas.

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Factory and Dispensary.
ASK FOR ANY FEVER
Ague Killer.
1 Phial As. 8. Doz. Rs. 5.
and our other popular remedies. Can be had everywhere at Cheapest Rate.
Pearl & Co.,
Victoria Garden, Bombay.

2363 K. N., Karachi. Formula of face cream appeared in July 1924 issue. Phenol blue may be bought of Hansraj Vishram 13, David Joseph Lane, Calcutta.

2364 B. P., Thakurdwara. To dispose of the stocks of tents you have advertise in, some widely circulated paper as INDUSTRY.

2365 A. N., Kamalia. Wants to be be put in touch with importers of Alexander brand sewing thread and manufacturer of tiger brand reel thread and Krishna marked reel thread

2369 R. S. C., Kottar. Your purpose will best be served if you go though South Indian Commercial Directory, Commercial Directory Office, Ernakulam.

2370 G. T S., Conjeeveram. Your enquiry regarding kilmanji seed was published in the Trade Enquiry columns of INDUSTRY and several letters received in response were duly redirected to your address. Kapila powder may be had of N. S. Chadhi & Sons, Piplanwala, Hoshiarpur. Yarns may be had of M. A. Ahmed Batcha Saib & Co., 16 and 17, Second Line Beach and R. Coleman & Co., 136, Broadway ; both of Madras. Shellac is exported by Daw Sen & Co., 13, Kenderdine Lane ; M. M. Ispahani & Sons, 51, Ezra Street; both of Calcutta and Eastern Commercial Co., 28, Second Line Beach, Madras. Silk may be supplied by Dyce & Co ; Jardine Mathersons & Co , and A. C. Patel & Co., all of Shanghai, China.

2371 I. T. S , Myingyan. Process of preparing dry ginger will appear in an early issue.

2374 P. K., Dhamtari. Can supply sagoon timber.

2375 B. B. B , Hooghly. An article on Zarda and Snuff appeared in October 1924.

2376 P. S. C., Lahore. Moulds for toys, etc may be supplied by Gebr. Schneider, Giessformen-Fabrik, Leipzig Gohlis, Hallischestrasse, 119-121, Germany.

2377 K. C. D. G., Jamalpur. Raw wool may be bought of N. K. Joshi, Almora, U. P.

2378 M. C. Bombay. Glass phials may be had of S. K. Dey, 124, Shova Bazar Street, Calcutta. Brushes may be bought of Bonner & Co., 209, Cornwallis Street, Calcutta and Brushwares Ltd., 128-1, Halsey Road, Cawnpore.

2379 P. V. R., Vizagapatam. Sheet metal machines may be supplied by Taylor & Challen Ltd., Birmingham, England. Aluminium sheets may be bought of Riess & Osenbag, Massenstrasse, 35 and Terpitzvon & Wachsmuth, Kurfurstenstrasse 15-16 ; both of Berlin, Germany. Formula of lime juice glycerine appeared in August 1921 issue. Nail making machines may be supplied by Bard & Copper Ltd., Booth Street, Handsworth, Birmingham and Watkings James & Co., Helena Street, Parade, Birmingham ; both of England.

2382 K. R., Delhi. For the machines required write to Eroom & Co., Dhurrumtala Street, Calcutta and Sprague Canning Machinery Co., Chicago, Illinois, U. S. A.

2384 P. B S., Beliatta. For pictures write to E. David, Cite Rougement, Paris, France and Photochemic G. m. b. H , Stolpischestrasse 37, Berlin, Germany. For more addresses please go through June 1923 issue of COMMERCIAL INDIA.

2386 R. N. S., Bhatkal. Recipe of incense sticks appeared in May 1924 issue. Canning machinery may be supplied by Anderson Barugrover Mfg. Co., San Jase, California, U. S. A. For books on canning write to Book Co., 4-4A, College Square, Calcutta and

ETT DEY & CO

ORIGINAL HOMEO PHARMACISTS

42, Strand Road, Calcutta.
Dealers in Original Homoeopathic dilutions
and Biochemic Triturations.
CATALOGUE FREE ON APPLICATION.

Thacker Spink & Co., 3, Esplanade East, Calcutta. Mr. Srikishendas Dutt, Dharamtala Street, Calcutta deals in pickles. For more formulas of pickles please consult a book on the subject to be published from Industry Office. Formula of vinegar appeared in January 1924 issue.

2387 B. M. B. C., Jaipur. Stationery articles may be supplied by Gleichmann & Co., Ferdinanstrasse, Hamburg, Germany; King Brothers, 15, Bury Street, London E. C. 3; Kakunaka & Co., 140, Ihogami-dori, 5, Chome, Kobe, Japan and The Claton Manufacturing Co., 127, Duane Street, New York, U. S. A.

2388 N. B., Gujranwala. Glass bottles of required size may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta.

2389 D. N. D, Rowha. An article on Sathi appeared in December 1921 issue. Simply an ordinary oat grinding machine will be required for sathi making. There is no such institution either in India or abroad known to us.

2390 A. E O. M. H., Rangoon. For caps enquire of Kraus & Hoffmann, Reichanberg, and Johann Liebieg & Co. Reichenberg; both of Czechoslovakia. Condensed milk may be supplied by F. A. Veron, Effingerstrasse 19, Berne and Nestle and Anglo-Swiss Condensed Milk Co., Cham; both of Switzerland. Tea may be bought of Bhattacharyya & Co. Ltd, 64, Cornwallis Street: Eastern Agency Co. Ltd., 2 and 3, Lall Bazar Street and Durgabari Tea Co. Ltd., 172, Bow Bazar Street; all of Calcutta.

2392 P. L. N., Bobbili. Can supply tobacco in large quantity.

2393 V. P. R., Masulipatam. Bitumen powder may be had of Calcutta Camera House, 158 Dhurrumtola Street, Calcutta.

2394 P. A. S., Masulipatam. For diamond write to Ehrmann & Bahlson, 18, 19 & 20, Holborn Viaduct, London E. C. 1 and J. K. Gulland Ltd., 8, Victoria Street, London S. W. 1.

2395 V. R., Vizagapatam. Flour grinding machines may be had of Oriental Machinery Supply Agency Ltd., 20-1, Lall Bazar Street, Calcutta.

2396 A. T. J., Moulmein. Formula of hair cream appeared in August 1921 issue. Add sodium silicate to your soap to make it hard.

2399 A. R. M, Najibabad. The following are the addresses of cloth mills. (1) Butts Spinning Co. Ltd, Leigh, Lancashire; (2) Egmont Spinning Co. Ltd., Mossley, Manchester; (3) Birla Mills Ltd, Oriental Bldg. Fort Bombay; (4) Century Spinning & Manufacturing Co Ltd., Gresham Bldg. Esplanade Road, Bombay; (5) Barse Spinning & Weaving Co. Ltd., Barsi Town, Sholapur; (6) Ahmedabad Laxmi Cotton Mills Co. Ltd., Raipur Gate, Ahmedabad; (7) Gujrat Spinning and Weaving Co. Ltd., Outside Kalupur Gate, Ahmedabad; (8) Central Provinces Swadeshi Spinning-Weaving & Mnfg. Co. Ltd., Nedham's Park, Nagpur; (9) Bengal Luxmi Cotton Mills Co. Ltd., 28, Pollock Street, Calcutta; (10) Dunbar Mills Ltd., 21, Strand Road, Calcutta and (11) Kesoram Cotton Mills Ltd., 42, Garden Reach, Calcutta For more addresses please consult any Directory. For Japanese matches of required brands write to H. Rashid & Co., 15 Zakaria Street, Calcutta, Piece-goods may be supplied by D. Chothia & Co., 375, Hornby Road, Bombay. Khan & Khan, 10,

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Medows Street, Fort, Bombay; B. P. & A. B. Bysack, 102, Khungraputty Street, Calcutta; B. N. Hazra & Co, 30, Cotton Steet, Calcutta; Badri Dass & Sons, Chadnnichowk, Delhi and Bisveswar Nath, Katia Nil, Delhi.

2400 F., M., Cairo. For the required book write to the Government Central Book Depot, 8, Hastings Street, Calcutta.

2401 K. V. A., Madura. Indigo is largely consumed in Malabar Coast.

2402 C. G. M., Barada. Wood working machines may be supplied by Carl Vorbes Machinebau, Hamburg, Ostesstrasse 166, Germany and Geis & Co., Leipzig-Gohlis, Germany. You will not be able to start a pencil factory with less than Rs. 50,000 at the very start. Graphite and not lead is used in pencil. Graphite is available in Ceylon. It will require Rs. 5,000 to start a spoon making factory. There are many spoon making factories at Moradabad. To be an apprentice you will have to approach them personally. The required machine may be supplied by Taylor and Challen Ltd., Birmingham, England.

2403 S. G. P., Ratnagiri. For formulas of scented hair oils please go through Hair Oil Manufacture published from this office.

2404 N. S, Hura. Formula of wood polish appeared in November 1923 issue. Process of wood staining will appear in an early issue.

2405 M. M., Kahror. In making celluloid rings you will have to buy celluloid sheets and cut them into desired shape and design. Gunny bags are manufactured by Birkmyre Bros., 8, Clive Row, Calcutta Your other query is unintelligible.

2406 N. K., Agra For cardboard box of required description write to Calcutta Fine Art Cottage, 16, Dharamtala Street, Calcutta.

2407 C. V. R., Rajahmundry. To sell bonemeal write the Superintendents of Government Agricultural Farms.

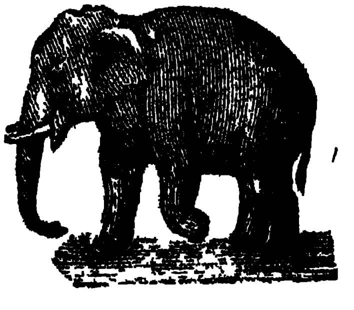
2408 Roll 1703. Please write clearly of what university you wish to be a Ph. D. For particulars write to the Rector of the University. You may write to, the Royal Asiatic Society of India, Park Street, Calcutta.

2409 H. D. M., Birand. Wants to be put in touch with dealers in cautchouc, traumaticin and silk paper. Will any of our subscribers supply him the articles?

2410 V. B, Multan Cantt. The following are the perfumery manufacturors: Schimmel & Co., Miltitz bei Leipzig and Heine & Co., A. G. Leipzig, Germany. Celluloid goods are manufactured by Feodor Rothe, Zelluloidwaren Fabrik, Chemnitz 24 and Celluloidwaren Fabrik G m. b. H, Grossstadtein bei Leipzig E.; both of Germany. Rubber toys may be supplied by Sachslard Gummiwaren fabrik, Burgel i. Thuringen, Germany. Tin goods are manufactured by Anton Reiche A. G., Dresden A 27 and Deutsche Blechwarenwerk-A-G., Braunschwig; both of Germany. Fountain pens may be supplied by Carl Hummel, Heidelberg, Habericht & Co., Berlin S. W. 47 and Siebert & Lowen, Elberfeid; all of Germany.

2411 S P. L., Kudra. Please seek legal advice.

2413 A. B., Boath. Litho stone occurs naturally. Litho stones may be had of The Litho Stone Mnfg. Co., 1103 Kalasi Palyam, Bangalore City and Finest Quality Litho Stone Co., 36, Great Wilson Street, Leeds, England.



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Best Quality at a competitive price
Apply for samples Prices and terms of agency—
THE EASTERN TRADING CO.,
Sandhurst Road,
Bombay, No 4

2414 *D. R., Pithapuram.* The address of the required ice machine dealer is not known. Small ice machines may be supplied by Burn & Co., 7, Hastings Street, Calcutta.

2415 N. N. R. L., Gulbarga. Please refer your query to the Registrar, Joint Stock Companies, Government Place, Calcutta.

2416 K. M., Berhampore. You may write to Calcutta Automobile Institute, 75, Bentinck Street; French Motor Car Co , 234-4. Lower Circular Road ; both of Calcutta. For address of motor workshops consult Thacker's Directory.

2417 Z. A., Arrah. The required chemical may be had of Oriental Industrial Co., 9, Bonfields Lane, Calcutta. Your other queries are outside the scope of INDUSTRY.

2418 S. D. N., Delhi. For label printing write to Deutscher Buch-und Steindruck, Tettowerstrasse 32, Berlin S. W. 61, Germany and Ernst Keils Nachf, G. m. b. H., Leipzig, Germany. Euphorbia juice may be had of S .N. De, P. O. Box 7851, Calcutta.

2419 V. S., Anakapalle. Can supply groundnut, gingelly and jaggery.

2420 K. P., Kottayam. Sewing machine and parts may be supplied by H. Ahlers & Berg G. m. b. H., Kiel, Germany; Beir & Co., Karlstrasse, 24, Karlsruhe, Germany and A. G. Mason Mfg. Co., Cleveland, Ohio, U. S. A.

2421 M. N. A., Nulavara, An article on cigarette manufacture appeared in September 1920 issue. At least Rs. 50,000 will be required for starting a cigarette factory.

2422 S. M. A. S,, Nagina, For medical directory write to Messrs B. K. Paul & Co , 1-3, Bonfields Lane, Calcutta.

2423 R. M. A., Badam. Motor and accessories may be had of H. A. Kadir & Co., Capol Nivas, Sandhurst Road, Bombay No. 4 and City Motor Car Co., 1, Lamington Road, Girgaon, Bombay. Cycles and accessories may be bought of Cycle Exchange and General Store, 41, Medows St., Bombay and Wellington Cycle & Motor Co., Shilotri Bank Bldg., 52, Tamarind Lane, Bombay,

2424 R. K. L., Rasra. Ear-drums may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta.

2428 J. A. C., Bahrein. "Heiko" stands for a certain trade mark. Heiko brand perfume, may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. In preparing perfumery you should use rectified spirit 60 over proof. Formula of *kum-kum* will appear in an early issue of INDUSTRY.

2429 R. C. B., Bangalore. Laundry machinery may be had of Symington Cox & Co. Mercantile Buildings, Calcutta.

2430 N. C. C., Khuranj. For carding machine write to Khadi Pratisthan, 15, College Sq., Calcutta. Carding machine may be supplied by W. H. Whish, Fenelon Falls, Ontario, Canada. For the required machinery enquire of H H. Mehta & Co., 123, Esplanade Road, Fort, Bombay. Addresses of foreign journals appeared several times in these columns.

2431 P. C., No address. One gramme is equal to 15.4324 grains. Now apply the formula given in the June 1924 issue. Mix barium sulphide, powdered quicklime and powdered starch in equal parts. Apply the powder with some water to the place from where the hair is to be removed. For printing press and types write to Ashutosh Auddy & Co , 16, Lower Chitpur Road,

Soap & Perfume Manufacturers.

FREE

samples of perfumes for above trade will be sent on recipt of the inquiries from bonafide manufacturers. Excellent qualities of the highest strength. Prices lowest. Write for Samples to-day.—

Anglo-Indian Drugs & Chemical Co.,

No. 155, Juma Musjid Circle.
P. O. Box No. 2082.
BOMBAY.

Calcutta. Chemicals and medicine, etc. may be supplied by Messrs B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta.

2432 S. A. M., Surat. If you just go through the recipe published in September 1924 issue of INDUSTRY you will find the detailed information on the subject. No such dictionary is known to us. You may however write to G. N. Mytu, Kingsway, Camp, Delhi.

2435 S. A., Ratnagiri. The Oriental Machinery Supply Agency, 20-1, Lall Bazar Street, Calcutta may ident the tobacco cutting machine you require on your behalf. For books on dentistry enquire of Messrs Butterworth & Co., 10, Hastings Street, Calcutta.

2436 T. S. M., Talavapanam. Please refer your query to Dr. Hiralal Ganguli, 5, College Lane, Uttarpara, Via Howrah; The Indian Academy of Science, Tinnevelly; The Eastern Hypnotic Home, P. O., Chodavaran, Vizagapatam and R. N. Rudra, P. O. Alamnagar, Rangpur.

2437 G. D., Amritsar. Please go through April 1924 issue of INDUSTRY.

2438 P. S., Chicacole. The Upper India Couper Mills Ltd., Lucknow is perhaps the oldest paper mill in India.

2439 G. R. B., Jullandhur City. *Gota* is a kind of lace used in end-pieces of saries. *Dut* is a narrow bordering woven with thick gold wire as the warp and silk as the weft.

2440 M. F. S., Kavitha. Match making machines may be bought of Bhawani Engineering & Trading Co., 122-1, Upper Circular Road and Bengal Small Industries Co, 91, Durga Charan Mitter Street; both of Calcutta.

2441 S. L. K., Bezwada. Match boxes and sticks may be had of Bhowani Engineering & Trading Co, 122-1, Upper Circular Road, Calcutta.

2443 A. K. G, Morar. For electro-homeopathic books enquire of Butterworth & Co., 10, Hastings Street, Calcutta.

2444 J. L. C., Lahore. The required books may be had of Government Central Book Depot, 8, Hastings St., Calcutta. Hosiery goods are manufactured by Economic Mills Ltd., 50-2, Dhurrumtola Street; Imperial Hosiery, 10, Ramchand Ghosh Lane; Bharat Lakshmi Hosiery Mill, 125, Bow Bazar Street and Tallygunge Hosiery Factory, 27-35, Russa Rd. South; all of Calcutta. Sewing thread may be had of Natoomal Chellaram, 828, Merriott Rd., Karachi.

2445 T. L. N., Ongole. Formula of fountain pen ink appeared in August 1922 issue.

2446 P. B. I., Jalgaon. Knitting yarns may be had of E. B. Bros. & Co., 11, Dharamtala Street, Calcutta. Knitting machines may be supplied by Indo-Swiss Trading Co., 28, Pollock Street, Calcutta.

2447 J. G. W., Firozabad. Wants to buy crucible for melting glass.

2448 M. M. D., Jodhpur. Please consult Thacker's Indian Directory where you will find a complete list of journals and periodicals of India.

2449 T. M., Gorakhpur. Process of preparing linseed oil will be found in March 1923 issue of INDUSTRY.

2450 M. R. K., Coorg. The required address is not known.

2453 I. S. N, Lahore. For the required book enquire of Mr. G. N. Mytu, Kingsway Camp, Delhi. Recipe of marking ink appeared in October 1924 issue. Process of bleaching and deodorising oils and fats appeared in 11th volume of INDUSTRY.

2454 K. S. M., Chirata. For the required lanterns enquire of Satish Ch. Daw & Co., 142-1, Old China Bazar St., and Lalit Mohan Kundu and Makhaun Laul Kundu, 192, Old China Bazar St.; both of Calcutta.

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No. 1 A. P. O Thalakwadi,
Belgaum, M. S. M. Ry.

2455 P. P. C., Masulipatam. Formula of cobra eggs appeared in September 1924 issue.

2457 K S C, Praddutur. Weaving machine may be had of B. D Bery & Co, 43, Ripon Street, Calcutta and H. M. Mehta & Co, 123, Esplanade Road, Fort, Bombay.

2460 T. M. B, Tellicherry. Your query being in the nature of an advertisement should not be published in these columns.

2461 H. D., Dikrang. For cleaning and preserving honey following process may be adopted. The honey is mixed with an equal weight of water, and allowed to boil up 5 or 6 times, without skimming; it is then removed from the fire, and after having been cooled, brought on several strong linen strainers stretched horizontally, and covered with a layer of clean and well washed sand, an inch in depth; the sand is rinsed with a little cold water and the mixed liquor is finally evaporated to the thickness of syrup. Printing machines may be bought of Ashutosh Auddy & Co., 16, Lower Chitpur Road; K. Banerjee, 133, Canning Street and John Dickinson & Co, Commercial Bldgs., Lall Bazar; all of Calcutta.

2462 M. V. L, Arsikere. First deodorise the oil then prepare soap with it.

2463 S. K. L, C., Delhi. For corundum grinding machine write to T. Thomson & Co, Esplanade East, Calcutta.

2465 V. A. R. I., Paramakudi. Soap colour may be had of Amin Chand Mehra & Sons, 34, Armenian Street, Calcutta. Caustic soda may be bought of Calcutta Chemical Co, Ltd, 35 Panditia Road, Ballygunge, Calcutta. Coconut oil may be supplied by Aspinwall & Co, Ltd and Jadavji Keshavji & Co, both of Cochin. Soap moulds may be had of Calcutta Industries Ltd, 71, Canning Street and Eastern Engineering Works, 22, Shambazar Bridge Road, both of Calcutta. You may go through 'Soap' by Mr. George Hurst.

2466 H. S. K. S, K., Cuttack. Pomades and hair creams are of ointment consistency. They cannot be made solid. Lard may be had of Calcutta Tallow Mart, 19 Tiretta Bazar Street, Calcutta.

2468 G. L. L. B, Ludhiana. Formula of catechu appeared in June 1922 issue. Vernacular equivalent of anise is *saonj* Vernacular equivalent of patchouli are *peholi*, *pacholi*, *pachapat*, *panel*, etc. Other spices you have mentioned being not indigenous their vernacural equivalents are not known.

2469 S. D. M., Allahabad. Envelope making machines may be bought of Oriental Machinery Supply Agency Ltd, 20-1, Lall Bazar Street, Calcutta.

2470 K. S M, Salem. For Tamil typewriter enquire of Remington Typewriter Co., Council House St, Calcutta. For husk burning furnace and allied literature write to Marshall Sons & Co, 99, Clive Street, Calcutta.

2472 P. V. P., Mathilakam. Everything necessary has been given in the process referred to by you Chemicals may be bought of Oriental Industrial Co., 9, Bonfields Lane; Calcutta Chemical Co, 35, Panditia Road, Ballygunge and B. K Paul & Co, 1-3, Bonfields Lane; all of Calcutta. Glass phials may be bought of S K De, 124, Shova Bazar Street, Calcutta. For trade mark registration write to P. Lodge & Co, P. O. Box 6772, Calcutta.

2473 K. V. K., Salem. For German Directory enquire of Consul-General for Germany, 2, Store Road, Ballygunge, Calcutta. For the required book enquire of Thacker Spink & Co, 3, Esplanade East, Calcutta.

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29-1, Telepara, Sampooker St., Calcutta.

2474 A. S. S., Attari. For trade mark registration vide No. 2472 above.

2477 T. B., Calcutta. Can supply nux vomica in very large quantities.

2479 S. C. B., Gosainhat. Formula of calico printing ink appears elsewhere in this issue. Blocks may be supplied by Padmashah Chakraverty, Noakhali.

2480 D. G. P., Tirupuraipundi. Ravivarma pictures and other accessories may be had of Ray Babajee & Co, 182, Lower Chitpur Road, Calcutta. Clocks and watches may be had of S. Mohamed Ibrahim, Radha Bazar Street; K. Edulgi & Sons, 5, Dharamtala Street; both of Calcutta. Cycle and cycle accessories may be had of Bentinck Cycle Co, 40, Bentinck Street; Chandra Bros, 57, Cornwallis Street, and S. N. Bhattacharji & Co, 5 Dharamtala Street; all of Calcutta.

2481 P. L, Jubbulpore. Formula of washing soap appeared in May 1924 issue. Recipe of writing ink appeared in June 1924 issue. Process of silvering glass appeared in March 1923 issue. For hair oils please go through Hair Oil Manufacture, published from this office. Formula of shaving soap will be found in November 1923 issue.

2482 D. N. M, Calcutta. Churning appliances may be had of Jupiter Trading Agency, Mulji Jeeta Market, Karachi. You may go through Principles and Practice of Butter Making by McKay and Larsen.

Cheapest House for
Sporting Goods
Silver Medals, Cups & Shields.
Fine Silver Medals in Velvet lined cases.
Rs. 3-12 each.
Largest Stock & Variety
Illustrated Lists Free.
Carr & Mahalanobis.
Chowringhee Corner, Calcutta.

2482 T. H., Jubbulpore. For kapok cotton write to Goolabroy Shewbux, 53, Cotton Street and Luchmandas Surajmall, 137, Cotton Street; both of Calcutta.

2485 C. R. S., Agra. Wants to be put in touch with importers of straw board from Germany. Straw board may be supplied by American Straw Board Co., Akron, Ohio and Delphi Straw Board Co, Decatur, Indiana; both of U. S. A. For nails, saws, etc write to E. Bernaets & Co, Bassen Kathurdik, 9, Antwerp and H. Delattre, Rue d Angleterre 51, Brussels; both of Belgium.

2486 S. R. S, Kottar. For envelope paper write to Messrs Ghosh Brothers, 63 J, Radha Bazar Street, Calcutta. For names of Indian trade papers and journal please go through Thacker's Directory. For home printing press write to Messrs S. C. Dutt & B. K. Dutt, 100, Durga Charan Mitter Street, Calcutta.

2489 N. L. N. C., Chamba. To communicate with any querist write to him direct by number and initials under care of Industry when your letters will be duly redirected.

2490 B. B. D., Jharsuguda. Candle making apparatus may be supplied by Calcutta Industries Ltd, 71, Canning Street, Calcutta.

2491 N. K. V., Rajahmundry. Recipe of peppermint lozenges appeared in November 1923 issue. For lozenge making machines write to Schulter & Co, Fenerback, Germany. For books on the subject write to Messrs Thacker Spink & Co., 3, Esplanade East, Calcutta.

2492 P. Y. N. S., Coimbatore. Sewing machines may be had of Singer Sewing Machine Co, Dalhousie Square, Calcutta and Contractor Bros. Kampith, Surat.

2493 I. A. E., Almora. Your previous letter is not traceable please repeat your queries.

2494 G. V. R., Masulipatam. Give your formula a trial and see what it results. Most probably the product will be similar to gem biscuits.

2495 A. Gharibabad. Formula of self-inking pad will appear in an early issue.

2496 S. E. M., Sattur. Neem oil may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. We do not deal in any article. For technical books write to Chackravertty Chatterjee & Co Ltd., 15, College Square, Calcutta.

2497 A. S. S., Bironkhal. For preserving rubber goods against cracking try a coat of paint varnish For Bengali books and monthly magazines write to Gurudas Chatterjee & Sons, 201, Cornwallis Street, Calcutta. Please refer to No. 2495 above.

2499 C. V. S. Cuddapah. Please refer your query to Registrar, Joint Stock Companies, Government Place, Calcutta.

2500 R. K, Aijal. Is ready to buy old newspapers and clothes, etc.

2501 S S. S, Lahore. Put some animal charcoal in the oil and place in the sun for 15 days, so that impurities may settle at the bottom, then pour the oil in another vessel The oil thus obtained will be both purified and deodorised. Take skim-milk cheese, cut into slices and boil it in water, wash it in cold water and knead it in warm water several times Place it warm, on a livigating stone and knead it with quicklime. It will join marble, stone or porcelain ware so that the joining is scarcely to be discovered.

2502 P. N. S., Monghyr. For paper write to Ghosh Brothers, 63J, Radhabazar Street, Calcutta. Glass phials may be bought of S. K. Dey, 124, Shovabazar Street, Calcutta and Satyacharan Paul & Co, 194, Old Chinabazar Street, Calcutta. For agricultural machines write to Flocken Nachf, Coburg and Agrikulturbedorfsges m. b. H., Berlin W. 9; both of Germany.

2503 F. H. B., Bombay. Vide No. 1816 in October 1924 issue. Hints for making papain from papaw will be found elsewhere. The method of obtaining rubber from the latter is described on another page. The manufacture of paper pulp from bamboo cannot be carried on as a home industry. The manufacture of vinegar and sugar of milk cannot be undertaken with such a small capital. Foreign made match sticks are now not available in the market Try the Sunderband Match Factory, 12, Dalhousie Square, Calcutta. Regarding industrial loans and hand machine for gunny, please write to the Director of Industries, 4A Free School Street, Calcutta. We are not aware of the veracity or otherwise of all advertisements. The demand for morabba in U. P. seems to be wholly met locally. The formula for floating soap will appear shortly. If you wish to trade in your product please try the advertisement columns of INDUSTRY.

2506 S. G P, Harmabu. For coconuts to be used for seeding purpose may be supplied by The Nurjehan Nursery, 2, Kankurgachi 1st Lane, Calcutta Add very little quantity of carbolic acid to ordinary tooth powder. Collapsible tubes may be supplied by Vanesta Ltd, 1, Great Tower Street, London E C. 3 and Brooks Peel & Co. Ltd, 24, City Road, London E. C. 1.

2509 S. M P., Fatehgarh. Formulas of blueing gun barrel and polishing fountain pen barrel will appear in an early issue

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Apply to—

NOGI & CO., Bombay No. 4.

2513 J. M. C., Lucknow. Glass bottles and phials of required description may be supplied by Calcutta Glass and Silicate Works, 101, Cornwallis Street, Calcutta. Tablet making machines may be had of Calcutta Industries Ltd., 71, Canning Street, Calcutta. For drugs, etc write to B. K. Paul & Co., 1-4, Bonfield's Lane, Calcutta. Printing machines may be had of K. Banerjee, 133, Canning St. and Ashutosh Auddy & Co., 16, Lower Chitpur Road : both of Calcutta.

2514 L. A. S., Maradana. Electrical accessories may be supplied by Alfred Herling, Weidenan Sieg Westf, France ; Lohmann & Welschenhold Meinerzhagen, France ; Electrobedarf G. m. b. H., Charlottenburg, Windscheidstrasse 18, Berlin, Germany ; Harbert Grosswendt, Charlottenburg 5, Berlin, Germany ; Patrick & Wilkins Co., 51N, Seventh Street, Philadelphia, Pennsylvania, U. S. A. and General Electric Co. Ltd., 67, Queen Victoria Street, London E. C. 4 and Collins Electrical Ltd., 115 & 119, Clerkon Well Road, London, E. C. 1.

2516 P. C. S , Jalpaiguri. For a list of technical institutions in Bengal write to Director of Industries, 40A, Free School Street, Calcutta.

2521 G. R. C., Ponur. Please refer your query to the match expert Mr. A. P. Ghosh, 42, Beniapukur Road, Entally, Calcutta.

2522 V. G. P., Kumbakonam. Formulas of all articles referred to by you appeared in the last vol. of INDUSTRY. First manufacture them on a small scale then calculate the expenses.

2524 S., Aurangabad. For the book required you may try Book Co., 4-4A, College Square, Calcutta.

2525 P. H., Cherrapunji. Sewing machine of required trade mark may be had of Contractor Bros. Kanpith, Surat.

2526 B. R. G. B., Nainital. French chalk is soapstone which is a natural product available in quarries. German silver sheets and ingots may be had of Syed Abdul Kader, 144-5, Harrison Road, Calcutta.

2527 S. M. B. S., Lyallpur. Socks are manufactured by Genz Wheel & Co. Victoria, Hongkong.

2528 N. V., Mysore. Bengali novels may be had of Gurudas Chatterji & Sons, 201, Cornwallis St., Calcutta. Stationery goods may be bought of Nilmoney Halder & Sons, 106, Radha Bazar Street, Calcutta.

2530 C. S. J., Lucknow. For merry-go-rounds enquire of T. E. Thomson & Co., Esplanade East ; W. Leslie & Co., 16, Chowringhee and John King & Co., Strand Road ; all of Calcutta.

2531 T. P. E. C., Vizagapatam. Most of the oils referred to by you possess excellent properties and have cooling effect upon brain while lemon, citron, cloves and cinnamon oils have medicinal properties. Fly cantharides prevents baldness of head.

2532 A. B. C., Bombay. Citronella oil may be had of P. Mukherjee & Co., 29-31, College Street Market, Calcutta. Citronella oil is manufactured in South India and Ceylon.

2535 H. M. V., Lathi. For machine parts, enquire of Calcutta Industries Ltd., 71, Canning Street, Calcutta. Please advertise in newspapers for your invention. For patent registration write to P. Lodge & Co., Post Box 6772, Calcutta. The following are the main film companies of India : Pathe Cinema Ltd., Pathe Bldg., Ballard Estate, Bombay; Madan Theatres Ltd., 5, Dharamtala Street, Calcutta and Tajmahal Film of Co.,

FOR 1925.

A Few Posts of Sub-Agencies are open to bona-fide merchants and agents etc. for the World's renowned, quickest and largest seller, fever-killer (feavour-kealur). For terms apply sharp to—

(BRITISH PHARMACEUTICAL CO.)

—AGENTS :—

STERLING IMPORT COMPANY,

16, CENTRAL AVENUE,
(Central Avenue and Colootola Junction)
CALCUTTA.

Dum Dum Road, Dum Dum, Calcutta. *Stamp collection is a hobby which sometimes produces some money. Esperanto is a world language. For further particular refer your query to* British Esperanto Association, 17, Hart Street, London.

2536 S. D. S., Tajpur. Refer your query to Talbots Ltd., Lyons Court, Lyons Range, Calcutta.

2537 K M N. I, Madura. Paper manufacture on small scale will not be profitable You may however go through July 1923 issue of INDUSTRY which contains an article on paper making on a small scale.

2538 A K. O., Ajmer. Exports of peacock feathers from India are prohibited. Peacock feathers are supplied by The Indian Trading Co, Jaipur and Sri Ram Kamath & Co, 1, McLean St,, George Town, Madras.

2541 R. L., Amritsar. There is no easy process known of separating sugar from the residue of jams.

2543 A. W. S., Ambalangoda. Desires to be put in touch with dealers in and importers of precious stones in India, Burma, Siam, China, Java, Czechoslovakia, Holland, Switzerland, South Africa and France.

2544 B. L. T. C, Baramulla. List of trade journals of the world appeared in the September, 1924 issue of INDUSTRY under No. 1710 in Brief Queries.

2545 N. T. M., Karachi Write to the Registrar Joint Stock Companies, Government Place West, Calcutta.

2546 C. N, Laitkynsew. Tanned leather may be had of Chari & Co, 5, Misson Row, Calcutta and Haji Esmail Gulmahomed, Khadak, Bombay.

2548 I. C. & M. C., Calcutta. For methods of preraring medicinal specifics consult a physician.

2550 A. E. D. S., Ambalangoda. The sample you enclose is most probably quartz rock.

2551 J. C. T., Lahore. Wants an expert in china clay.

2552 X. Y. Z, Amritsar. An article [illegible] uses of soapstone appeared in December 1921 issue. An article on tile manufacture will appear in an early issue.

2553 S. V. M, Amod. Empty match boxes may be supplied by Sunderbun Match Works, 12, Dalhousie Square, Calcutta. Refer your query regarding share market to Calcutta Stocks and Share Syndicate Ltd, 2 & 3, Lall Bazar Street, Calcutta. Match making machines may be had of Bengal Small Industries Co, 91, Durgacharan Mitter Street, Calcutta.

2555 N K V, Rajahmundry. Answer to your query appears elsewhere in this issue under No. 2461.

2556 C. N., Bezwada German charka may be supplied by Indo-Erope Trading Co, Prinzre Gentenstrasse 94, Berlin, Germany.

2559 G E. C, Lyallpur. Match making machines may be had of Bhowani Engineering & Trading Co., 122-1, Upper Circular Road and Bengal Small Industries Co, 91, Durgacharan Mitter Street; both of Calcutta.

2560 K. S. M, Madras. You may apply hair lotion for keeping your hair in order Formula of hair lotion will be found in September 1924 issue. Process of softening horn appeared in September 1921 issue.

2561 P. K. S., Jalpaiguri. You may refer your query to Calcutta Advertising Agency, 15, College Square, Calcutta.

2563 L. D, Sirsa. The machines required may be supplied by Taylor & Challen Ltd., Birmingham, England.

German Aniline Dyes, and Chemicals of the well-known manufacturers

Messrs. Leopold Cassella & Co.,

Largely consumed by big Industries, such as Jute, Silk, Cotton, Wool, Leather, Paper, Inks etc.

—: STOCKISTS :—

Messrs. Fazlehusein & Brother,

PARTNERS OF THE LATE FIRM OF—

Mohamadali Alibhoy & Co.

44, ARMENIAN STREET, CALCUTTA.

2564 M. N. D., Calcutta. A list of newspapers and periodicals follows: (1) Bombay Chronicle, Medows Street, Fort Bombay; (2) Young India, 36, Chawpathy Road, Bombay; (3) Praja Mitra and the Parsi, Times Bldg., Bombay; (4) The Daily Express, 14, Mount Road, Madras, (5) Hindu, 100 Mount Road, Madras; (6) Madras Mail, 6, North Beach Road, Madras; (7) Wealth of India, 3-4, Kadi Chetty Street, Madras and (8) Weekly Chronicle, 50, Reddy Street, Egmore, Madras. For more addresses consult Thacker's Directory. You may go through Indian Medical Record, 2, Harokumar Tagore Square, Calcutta. Formula of pickles of amloki will be found in a book on the subject to be shortly published from INDUSTRY OFFICE.

2566 M. S S, Hospet. Fireworks may be supplied by Orient Fireworks, 85-1, Upper Circular Road, Calcutta.

2568 A. R., Nellore. To dispose of your laces advertise in some newspapers.

2569 L. S. K, Lalgudi. For further particulars write direct to the advirtiser. Of course there is prospect for radio operators and engineers in near future.

2570 R. R, Sialkot City. Socks are manufactured by Gonz & Wheeler, Victoria, Hongkong.

2575 R. S., Gaya. You may write to Bombay Fine Art Gallery, 69 Esplanade Road, Bombay for your requirements. For curios enquire of Dhanamal Chellaram 62-64 Medows Street and A. Bhicajee & Co. Apollo Bunder; both of Bombay.

2576 S. S., Tummapudi. Formula of a patent food like Horlick's maited milk appeared in July 1923 issue.

Specially for Christmas!
EXERCISE BOOKS
prepared in most up-to-date form from superfine quality of paper offered at most competitive rates to wholesalers!!
Largest demand! Unique Popularity!!
Write at once for quotations etc—
GANESH NAIDU, Stationary mart,
Mahal, Nagpur-City.

2577 A. N. D., Loralai. Apply the lotion for a few days until your hair becomes curling. You may prosecute your studies in the mechanical engineering line.

2578 S. L. M., Sambar Lake. Recipe of serpent eggs will be found in September 1924 issue of INDUSTRY. Formula of crakers you mention is not known.

2579 T. S., Kolar Town. Types may be supplied by The Madras Type Foundry, 15, Sunkuram Chetty Street, Madras; Gujrati Type Foundry, Gaiwadi, Girgaon, Bombay and Ashutosh Auddy & Co., 16, Lower Chitpore Road, Calcutta. Printing machine may be had of K. Bannerjee, 133, Canning Street; John Dickinson & Co. 3, Lyon's Range; A. Lall & Son, 15, Balaram Bose's 2nd Lane, Puddapukur Road, Bhawanipur and Ashutosh Auddy & Co, 16, Lower Chitpore Road; all of Calcutta. Wishes to buy fret wood and fret working tools.

2581 N. C. C., Khuranj. Buy bank drafts of the required sum and send that to the parties concerned. But you must approach those banks that have negotiation with foreign banks. Fountain pens are manufactured by Bankers Pen Co, 953, Broadway, New York, U. S. A: Pinless Stylo Pen Co, 14, Cedar Street, New York, U. S. A.; Lonna Fullfederhalter G. m. b. H, Kopenicker Strasse 5, Berlin S. O. 33 Germany and Hennefer Schreibwaren-Fabrik Rauche & Co., Hennel, Rhineland, Germany. Address of novelty dealers will be found in the November, and December issues of COMMERCIAL INDIA, the sister journal of INDUSTRY.

2583 C. N. B., Lucknow. Formula of Blanco appeared in March 1922 issue.

2584 S. M. A., Murree. Motor for motor cycles may be supplied by R. E. Joseph & Co. Ltd., 2-2, Chowringhee Road and Nundy Bros., 34, Dharamtala Street; both of Calcutta.

NOTICES AND REVIEWS.

Fountain Pen.

The full gold platen self-filling fountain pen (of German make) which the Jubilee Trading Co., of Triplicane, Madras has favoured us with is a serviceable one for outdoor writing work.

New Year Calendars.

We have received a sheet calendar for 1925 from The Meenakshi Harmonium Works, Krishnan Koil, West St., Palamcottah, builders and importers of musical instruments.

Instructive Game.

With the box-ful of capital alphabets supplied by Messrs Krishna Brothers, Shahjahanpur U. P., juvenile students will find it an easy task in spelling and word-making exercises through sport.

Hydraulic Toy

Many are the novel toys made by Sankar Gir Karyalaya, Askunda, Muttra, U. P. The Basudeva Cup is an ingeneous one. As soon as the water poured into it reaches Krishna's feet it begins to ooze out leaving not a drop. It is very captivating.

Drakshava.

Mr. P. N. Kelkar of Bombay Vaibhao Press, Girgaon, Bombay 4, has sent us a sample phial of Union Drakshasava which is a tonic food prepared from grapes.

Nerve Tonic.

Received from Messrs Rama Bros. Lchmian, Lahore, India a sample of Aksir-e-sheebad said to be a nerve tonic.

Pure Honey.

Readers of Industry are already familiar with The Himalayan Stores, Kasauli Hills, wherefrom pure products such as honey are available.

Eucalyptus Oil.

The "Aravind" Eucalyptus oil manufactured at Conoor appears to be of pure quality and therefore may be applied to all therapeutical purposes. It may be had of Lokamanya Agency, Bombay No. 4. Every encouragement should be given to this swadeshi industry.

Burma Progress.

Edited by A. R. Bhimani, 6, Mg. Taulay Street, Rangoon. Annual Subscription Rs. 8.

'Evidently the Journal stands for all round advancement as the subjects treated are not only literary but also scientific and industrial. They are calculated to promote cultural and material progress of the people and will amply repay careful perusal. We hope it will continue in its useful career in the progressive spirit manifested in the inaugural issue.

An Exhibition.

The Annual Fair and Industrial Exhibition will be held at Venkatagiri Town during the first week of March, 1925. Particulars may be had from The Secretary, Venkatagiri Gymkhana Club, Venkatagiri Town.

Artistic Calendars.

We acknowledge with thanks the receipt of (1) an artistic calendar from The M. B. Syndiate Auvanceswarem, S. I. Ry. who stock all kinds of weaving accessories such as reeds, healds, shuttles etc. ; (2) an attractive calendar from The Automatic Weaving and Knitting Works Ltd., Trivandrum, manufacturers of banians, sweaters, etc. Both are beautifully coloured.

The Match Industry in Danger.

By Mr. K. C. Sen. Published from Bani Mandir, 195-1, Cornwallis Street, Calcutta. Price One Rupee. Pp. 72. With a Foreward by Capt. J. W. Petavel, R. E. (Rtd).

As the author of Match Industry in India which we had occasion to review in an early issue Mr. Sen has already established his name as an authority on the subject. He is therefore the fittest person to diagnose the situation confronting this new industry. For the benefit of the Indian match manufacturers he has endeavoured, in this book, to make a brief survey of the industry from its revival up to the present time. In conclusion he points out the dangers to which the Indian match industry has been exposed by the starting of well-equipped match factories with foreign capital, foreign expert and foreign resources. The suggestions he makes for saving the nascent industry whose very existence is threatened are valuable. His opinion ought to carry weight in proper quarters and his recommendations paid heed to.

Practical Knowledge.

Published from Practical Knowledge Offiice, Karaulbagh, Delhi. Annual Subscription Rs. 3 only.

Without proper training of the body and the mind no person can hope to win in worldly struggle which is already keen. Tne articles written with a view to the attainment of physical and mental efficiency will be helpful to those who wish to achieve success in life.

Physical Culture Magazine.

Founded by Prof. M. V. Krishna Row, and published monthly by Physical Culture Institute, P. O. Basavangudi, Bangalore. Annual Subscription Re. 1-8.

The utility of physical culture has found popular expression in the dictums "a sound mind in a sound body" and "health is wealth." The subject matter comprises health and disease ;

TAKE CAUTION
NOTHING IS MORE GENUINE
THAN
FEVER-KILLER
(FEAV-UR-KEALUR)
FOR ANY FEVER
Sold everywhere at As. 12 per Phial.
BRITISH PHARMACEUTICAL CO,
Agents--Sterling Import Co.
16, CENTRAL AVENUE,
Colootola & Central Avenue Junction, Calcutta.

dietary and nutrition; beauty and cleanliness; sport and exercise; nerves and muscles—all relating to physical development and well-being the *sine qua non* of worldly success. In these days of physical degeneration it is very reassuring to find the journal carrying on its mission of strength in a manner befitting the "creed" of its founder.

Service.

A monthly magazine of youths and scouts edited by Shewak B Motwane, Larkana, Sind. Subscription Re. 1-8.

As will be clear from the Title the aim of the journal is to do service like a scout. It will try to inculcate in the younger generation the spirit of truth, service and reform. A laudable object no doubt.

The Indian Library Journal.

A quarterly magazine published on behalf of The All-India Public Library Association, Bezwada. Annual Subscription Rs. 4.

Constituting as they do a medium for the spread of education amongst all classes of people libraries are valuable institutions. But unfortunately the number of libraries in this country is not commensurate with the need of the people. So any effort such as the promotion of the public library movement and organisation of the resources thereto has our heartiest support.

Acknowledgments.

We have received with thanks copies of (1) Sri Padmasali, Telegu Monthly Magazine, 93, Thiyappa Mudali Street, G T, Madras. (2) The Samarasa Bodhini Tamil Biweekly Newspaper.

The Indian Railway Magazine.

Edited by Mr. S. V. Aiyar No. 335 Thambu Chetty Street, G. T. Madras.

Realising that the Railways are to play a very significant role in the future economic development of India this illustrated monthly intends to deal with all sorts of railway problems. The idea is good. It will justify its existence if it seeks to redress grievances and effect improvements relating to both travel and transport.

Current Thought.

Published by S. Ganeshan, 28, Pycrofts Road, Triplicane, Madras.

Devoted to the discussion of everything that is calculated to make human life more and more noble and worthy, this monthly is fortunate in securing contributions from some of the greatest personalities in the world of thought to-day. As is to expected the articles are very instructive and furnish much food for reflection.

The significance of such a journal in developing rational thinking power will be realised when it is pointed out that not only does thought move the world but it is imbued with infinite creative energy. We therefore wish the journal the success it so richly deserves.

Knitting Machines & Hosiery.

Hosiery and mantles are produced by the Behar Knitting Factory, Mogalpura Street, Patna City. The socks are close-knitted and are of different sizes, colours and materials while their prices are moderate. The firm also deal in knitting machines of all kinds.

Orange Honey
Rupee one per lb.
NAUG'S AGENCY,
P.O. KULAURA (SYLHET).

Wonderful Foretelling.
Wonderful future events for one year in detail costs Re. 1 only along with full character sketch. Five years Rs. 3. First part life reading in 10 items Rs 10. Complete Whole Life Reading in 20 items including Longevity Rs. 25. Send birth particulars or time of writing letter Apply to:—
THE EASTERN ASTROLOGICAL HALL,
Vizagapatam, B. N. Rly,

New Prizes for Vol. XV.

The Editor of INDUSTRY invites its subscribers to compete for the following prizes offered for the ensuing session.

I. New Ideas for Small Capitalists.

We offer 5 Prizes of Rs. 5 each for ideas which can be succesfully adopted by a young man with capital up to Rs. 500 only in his pocket to earn a decent livelihood. Schemes for starting small industries will be welcome but stress will be laid on their practical adaptability which will influence decision.

II. Suggestions for Self-Supporting Students.

We offer 5 Prizes of Rs. 5 each for suggestions which can be easily carried out by students who follow the principle of earning while learning and which must enable them to defray their expenses at least. The practical nature of the suggestions will be taken into consideration in awarding the Prizes.

III. Occupation for Purdahnasin Ladies.

We offer 5 Prizes of Rs. 5 each for details of useful domestic industries which can be worked by the female members of a family in their spare hours. Special opportunities may be pointed out how a helpless widow can earn a decent living for herself.

Chandramukhi - - - Oil. This is the renowned, powerful and celebrated Hair restorer ever produced. It is a boon to brain workers. For beautifying and increasing the growth of Hair to prevent its falling off, to produce cooling sensation to the head it is unequalled Besides it possesses most sweet & delicate fragrance As. 12 per bottle. Try it once. GREAT INDIAN PERFUMERY, Farrukhabad, (U. P.)

IV. Village Manufactures.

We offer 5 Prizes of Rs. 5 each for descriptive notes on the industries of the readers' villages. The narrative should give synopsis of the existing arts and crafts, their past history, present condition, future prospect, raw materials used, working processes, market for products, etc. It should be accompanied by a complete list of names and addresses of persons engaged.

Rules for Competition.

1. Only subscribers to INDUSTRY are eligible for the Prizes.

2. The Editor's decision will be final and he will be at liberty to publish any communication in any way he likes. The names of successful candidates will be published in the first issue of the next volume.

3. The Editor will not be responsible for loss of or damage to any correspondence, neither will he remain bound to return any Manuscripts.

4. The Editor cannot enter into any controversy regarding unused or rejected Manuscripts. But in case requisite stamps are enclosed every endeavour will be made to send them back.

5. The Ideas, Suggestions and Articles for the separate sections noted above must be written on one side only on separate sheets of paper and addressed to—

THE COMPETITION EDITOR,
"INDUSTRY"
Shambazar, Calcutta.

Notice

Those letters answers to which could not be prepared in time for this issue will be treated in our next.

Trade Enquiries.

[Letters to the parties are to be addressed by number and initials under care of INDUSTRY when these will be duly redirected]

2632 G. T. S., Conjeeveram. Wants to be introduced to dealers in cotton yarn, raw silk, kirmanji seed, kajula or kamila powder and stick lac.

2640 K. D. B., Bankura. Can supply *tussar* silk and clothes.

2643 M. M. I., Murree. Can supply machines for preparing corrugated packing cardboard.

2644 R. V., Vizagapatam. Desires to be put in touch with agents and general produce brokers.

2649 S. M. C., Ahmedabad. Can supply casein.

2663 D. N. D., Sylhet. Can supply fish oil.

2684 C. J, Marwarpali. Is ready to buy second-hand English clothes in large quantities.

2686 B. W., Laitkynsew. Can supply ginger, turmeric, coffee chaulmogra seeds, honey and other indigenous herbs and spices.

2717 R. P. G, Umaria. Wants to be put in touch with dealers in kaolin, red and yellow ochres, red oxide, *dhawai* flowers and bauxite.

2730 K. C. R. C, Barisha. Desires to be introduced to dealers in broom stick, coconut fibre and tamarind.

2731 G. K. G., Sylhet. Can supply molasses in very large quantities.

2747 D. R. V. P. S., Moga. Wants to be put in touch with dealers in chillies, peacock's feather, broken glass pieces and soda water bottles.

2750 S. H. K., Bombay. Can supply all sorts of insects and wild animals.

2761 F. V., Calcutta. An educated and experienced horticulturist wants a capitalist to start a farm as nurserymen, seedsmen and florists.

2765 O. T. C., Calcutta. Can supply match chemicals, acids, soap chemicals, dye chemicals, scientific apparatus and industrial chemicals.

2776 G. N. V., Aligarh. Wants to know the address of the sole agent of Charles D. Young & Co., Perth, N. B.

2785 G. M., Calcutta. Desires to be put in touch with manufacturers of silk hosiery articles of Calcutta.

2786 M. R. R., Hyderabad. Wants to be an apprentice in a good mirror making firm in Calcutta.

2793 M. A. H. S., Lashkar. Wants to be put in touch with dealers in gelatine or celolide sheet.

2801 N. G. S., Secunderabad. Can supply neem seed oil and cakes

2809 N. K. G., Calcutta. Would any gentleman kindly inform names and addresses of labour contractors in Madras who carry on business in wooden toys and small boxes.

2811 N. V. C., Akola. A photographer wishes to join film industry.

January Issue of Industry.

(*In the Press.*)

The January issue of INDUSTRY will contain articles on Wool dyeing, Poultry keeping etc. in addition to Formulas, Small Trades, New Ideas and other useful features. Any friend of our subscribers may get a copy free as sample on application to the Manager, INDUSTRY, Shambazar, Calcutta.

INDUSTRY.

Is a monthly Journal of Technology and Handicrafts, Science and Commerce, Agriculture and Business The rate of subscription is as follows:—

Indian Rs. 3 Foreign Rs. 5-4.

The charge is for complete yearly volume only, inclusive of postage.

Single Copy As. 5 only.

BUSINESS NOTICE.

Industry is published at the end of every month

Subscribers are enlished at any time of the year but they will receivr only the number from April to March comprising a complete volume for one year's subscription.

At the time of sending a V.P.P. only the current number is generally sent. The previous issues of the volume are sent per book-post on receipt of the value of the V.P.P. For particulars and Advt. rate please write to—

Maneger, INDUSTRY OFFICE,
Shambazar, Calcutta.

Managing Editor—MR. K. M. BANERJEE.

INDUSTRY

A Journal of Technology, Handicrafts & Commerce

Vol. XV. CALCUTTA, JANUARY 1925 No. 178

The Utility of Failures.

PARADOXICAL as it may appear failures lead to success for wisdom gained through a single failure is more serviceable than experiences gathered from a number of successes.

Study the causes of your failures, therefore, and be wise. Analyse them with scrutiny. They will point out your weaknesses ; they will lay bare your ineptitude : they will show up the qualities you lack in. Indeed they will furnish object lessons from which you could learn the secrets of success if you would. Do not let their teachings be lost upon you.

By failures you become naturally alert and learn to guard against eventualities. You become cautious and well able to calculate the probabilities beforehand. You attain efficiency and maturity and your judgment is sound. The chance of your loss in future operations is thus minimised. This is no inconsiderable gain.

Everything, however, depends upon how the failures react on your mind : how you allow them to shape your activities. If they dampen the spirit and slacken the ardour you are no doubt doomed for ever. But on the contrary if you proceed onward undaunted by the failures and undeterred by the circumstances brought about by them you gain the upper hand of the successful man. Surely failures will stand you in good stead if you properly utilise them.

The importance of failures as a universally recognised factor of success has found popular expression in such significant bye-words as "failures are the pillars of success," "failures are the stepping stones to success" and the like. They need not cow you down. Try, try, try again and you will succeed.

Remembering that experiences are the most valuable assets in the struggle of life, make your failures serve your purpose. Let them not divert you from your goal nor hamper you in your progress.

INDIA'S INDUSTRIAL PROGRESS.

Hand-loom Weaving in Ceylon.

From very early times hand-loom weaving has existed at Batticaloa in the east and at Jaffna on the north of Ceylon; and spinning, dyeing and painting were done at both these centres. In recent times, however, spinning had died out almost entirely, while dyeing is still done to some extent, but it is confined to the long used colours, such as chocolate, black, and brick red, got by boiling yarn with certain natural colours. Yarn dyed with artificial dyestuffs is obtained from India and England at high rates. Endeavour is being now made by the expert at the Rajagiriya hand-loom weaving mills to learn the best methods of dyeing yarn with foreign dyes.

It is estimated that there are about 4000 hand-looms in Ceylon at present. If all these looms work 200 days in the year, and each produces an average ten yards of cloth per day the total outturn would be 8,000,000 yards of cloth. Hand-loom cloth is used by the poorer folk largely.

Match Factory at Mysore.

The forests of the Mysore State abound in several varieties of soft woods, well suited for the manufacture of matches. The Government of Mysore have had these forests carefully surveyed by a European match expert as well as by their special forest officers. The woods have been tested by the expert and also by Mr. A. Roller of Berlin and their reports are very favourable.

A company has been registered in Bangalore for the purpose of establishing a match factory in the Mysore State equipped with up-to-date machinery for manufacturing matches. The promoters of the company have secured from the Mysore Government the exclusive right of extracting soft woods, suitable for the manufacture of matches from the forests of Shimoga, Kadur and Hassan district. At present it is proposed to start a factory with a capacity of manufacturing about 2000 gross match boxes per diem. The factory will be located in Bangalore City and is expected to start manufacturing in about a year.

Technical Institutions in Bengal.

We learn from the Report of the Department of Industries, Bengal for 1922-23 that during the period under review the number of industrial and technical schools maintained by Government was 28. The number of non-Government institutions during the year was 65 against 60 in the preceding year. Of these 59 were in receipt of grants-in-aid. The total number of pupils attending these 93 schools at the close of the year was 4,039. The total expenditure incurred on them during the year was Rs. 5,73,805, of which Rs. 2,17,275 was contributed by the Government; Rs. 81,035 from local funds; the balance was met from fees, endowments, and other private sources.

Two State technical scholarships tenable in England were awarded during the year under review for studying silk weaving, reeling and dyeing; and the manufacture and refining of vegetable and fish oils.

Wool Dyeing.

THE dyeing of wool may be effected at four different stages of its manufacture, viz :—

(1) Loose wool
(2) Slubbing
(3) Yarn
(4) Woven Piece

The particular stage in which the wool is dyed depends upon the quality and class of goods into which it is going to be manufactured. Dyeing in the form of loose wool or slubbing is the most expensive, but gives the best results. While dyeing in the piece is the cheapest method and is adopted whenever circumstances will permit. In whatever form the wool is dyed it is essential in order to obtain fast, clean and level results, that the wool be efficiently scoured, so that the colour may not be prevented by grease from penetrating the fibre.

Loose wool is dyed in open vats of iron or wood. Slubbing is dyed in the ball form in suitably constructed machines or wound into hanks and dyed in an ordinary cistern. Yarn is dyed in a suitably constructed machine or in the open cistern. In piece dyeing the Winch machine is at present in vogue. In some cases, where a pure and high grade fabric is desired, it is required to carbonize wool stock before dyeing. It has for its object the removal of vegetable impurities from the wool. Carbonizing is a constant source of trouble if care is not exercised in carrying it out. Wool is carbonized in the form of loose wool or pieces. The wool is saturated with sulphuric acid 5°Tw., then hydro-extracted and dried at 180°F. This treatment disintegrates all vegetable matter.

As wool comes into the market, it usually represents a very impure article, containing from 30 to 80 per cent of foreign substances. They must, therefore be thoroughly scoured to effectively dye them.

The general impurities found in raw wool fibre of the fleece are

(a) Grease or wool-fat.
(b) Suint, or dried-up perspiration.
(c) Dirt, consisting of dust sand, burrs, etc.

The purpose of scouring is to remove these impurities and leave the fibre pure and clean without material injury to its good qualities. The greasy matters in the fleece are known as wool-fat. They are insoluble in water, but are readily emulsified by solutions of soaps or alkalies. The suint consists of various metallic salts of organic acids. These salts are soluble in water and hence are easily removed in the scouring. The miscellaneous dirt in the wool is not soluble in water and is simply mechanically removed by the agitation of the wool, in the process of scouring. The loss in weight that wool undergoes on scouring is termed its shrinkage, and forms an important item in judging the value of raw wools.

The chemicals chiefly employed in the usual method of scouring wool are soda ash and soaps.

Frequently, however, a mixture of soda ash and soap is used, the proportion depending on the quality of the wool to be scoured and the amount and nature of the impurities present. A note of warning should be raised here. Wool fibre is rapidly injured by solutions of alkalies at high temperatures. The scouring of wool should therefore be carried out at as low a temperature as is compatible with perfect removal of the impurities. The soaps and other ingredients used in the scouring solutions should also be free from any appreciable amount of caustic alkali.

The temperature of the scouring bath under ordinary conditions should not exceed 140°F. and in the case of fine lustre-wools the lower temperature of 100 to 120°F. is used.

After removal from the soap solution the scoured wool should be thoroughly cleansed from alkali and soap by washing in water. This step is very necessary as otherwise the subsequent operations will be marred and the dyeing injured. The ordinary method of scouring wool by the use of solutions of soaps and alkalies, referred to above, is called an emulsion process.

The goods, well washed and soaked, are warmed gently in a bath containing, besides the dyestuff dissolved in plenty of water, a little sulphuric acid and a quantity of Glauber's salt. Both the acid and the salt must be free from iron, or the shade will be dulled.

The amount of acid to be used may vary between considerable limits without affecting the results. If too much is present, there is the danger of injuring the feel and the lustre of the fibre. If there is not enough acid in the bath, the colour will wash right out of the wool, as soon as it is rinsed. In general it is well to start with about one ounce of dilute sulphuric acid for each gallon of dye liquor and about twice that amount of Glauber's salt.

The bath is gently heated with constant stirring of the goods, until the right shade is produced, or, if it is desired to exhaust the bath and so waste no colour, until near the boiling point. The goods when taken out of the dye-bath must be washed very thoroughly, to remove the last trace of acid, which otherwise on drying would ruin the wool.

In dyeing wool skeins on a commercial scale it is of the utmost importance to have the colours perfectly level and uniform. This uniformity is easily assured by having the wool thoroughly wet before placing it in the dye bath; by having it well loosened out and well stirred so that the colour will penetrate into every part of the material evenly; and, finally, by starting the bath at a moderate temperature and heating it gradually, until the proper shade is obtained.

Again great care must always be taken to preserve the lustre and the soft effect of the wool, and to avoid felting. This can be best done by using moderate amounts of acid, by dyeing at moderate temperature and never raising the dye bath quite to the boil and finally, by handling the goods as little as possible in the bath.

In dyeing with the average acid dyestuff the bath in which there is about one foot of water, is charged with the requisite colour and Glauber's salt. This is boiled for ten minutes, then the bath is thoroughly stirred with a rake. The material is entered, worked ten minutes, steam turned on, and the bath brought to the boil in ½ hour and dyeing continued at the boil for ½-1 hour. The amount of Glauber's salt and sulphuric acid used varies with the depth of shade.

Finally when light, bright, and delicate colours are to be obtained on loose wool, it is generally necessary to employ bleached stock.

Bleaching by the use of sulphurous acid gas is the method mostly practised for the bleaching of wool. The wool (in any form) is moistened and spread out or hung in a room where it is subjected to the action of the sulphurous acid gas for ten to twenty hours. The gas is produced generally by the burning of sulphur in an earthen ware pot in the bleaching room itself. The wool must be thoroughly scoured for bleaching and should be in a moist (though not wet) condition, as the gas acts but slowly on the dry wool. The wool must be so distributed that every part may be exposed to the gas. Wool may also be bleached with the help of sodium bisulphite, hydrogen per oxide, or potassium permanganate.

Poultry Raising--II.

THE BREED.

THERE are many breeds of fowls that are about equal in merits and popularity, but in making a selection "strain" must be considered. After strain come feeding, management, housing, etc. Again in selecting a breed one must study the nature of the soil, environment, etc.

It is advisable to stock both light and heavy breeds, not only to be able to supply sittings, chicks, and stock birds in both kinds, but to equalise the supply of eggs throughout the year. Also where the demand for eggs, chicks and birds is good popular varieties should be selected.

Here are some typical breeds :

Heavy—Rhode Island Reds : white wyandottes :

Light—White, Black and Brown Leghorns.

Best Layer—Orpington : Rock Brahma ; Chittagong, Cochin, etc.

Table Fowl—Game, Langsham, Sussex, etc.

Sitting varieties are those that by nature show a desire to sit or incubate their eggs. On the other hand non-sitting varieties do not show a desire to sit.

The common country hen, called the Pati, is, as a rule, the best mother of all fowls. It has been authoritatively stated that there are really only two or three pure breeds of fowls indigenous to India. The first is the Chittagong breed, and the other is the Asseel and in Western India the Busra fowl. There is a large number of fowls of different sizes, shapes, and colours to be found all over India. These are for the most part very much like the jungle fowl.

BREEDING.

In selecting the stock birds care must be taken that they are healthy and well-matured. Age should be on one side for which reason it is customary to mate (1) cocks to pullets and (2) cockerels to hens. Early in the season four or five heavy breed and five or six light-weight females can be mated to each male. Later the number can be increased to eight or nine.

Cocks for breeding purposes must be of good size, must have plenty of flesh : broad chest and erect carriage. Other requirements are that they are of right shape, good colour, active, young and healthy and of good pedigree. Similarly hens for breeding purposes should possess the above qualifications. Also they must not be too fat, must be quiet and tame and must come to lay early.

The male bird should be well fed by choice tidbits. Only mate up females that are in lay or on the point of laying. Males should not be run with hens all the year round.

Directly the breeding season is over break up the hens and separate the sexes.

There are certain rules for breeding which should be observed carefully. In-breeding should be avoided : that is the birds must be bred outside prohibited degree. Pullets should not be used for breeding purposes. Males of more than two years old may not be employed. Of different kinds of breeding line-breeding is a modified form of in-breeding, stain-breeding is breeding with the object of fixing a characteristic and cross breeding is mating pure-bred birds of different breeds. Single-mating means mating. Double-mating means selecting both parents with the one object.

Poultry breeding is carried on either for utility or for fancy.

(1) Utility—When breeding for eggs the males must be from heavy laying mothers while the females must be chosen from those that lay large eggs and rich coloured eggs.

(2) Fancy—As the colour of the head of the hen tinges the progency head—coloured birds should never be used. In females size, type, barring, etc. must be looked for.

Home Industries.

(By a Practical Expert.)

Lac Bangles.

(RULI)

GRIND chalk to fine powder, add linseed oil and knead into a dough. Soften the mass by repeatedly pounding with a hammer. Make some circular rings of different sizes by binding thick iron wire. Paste a quantity of the above prepared mass round each ring and smooth off. Dry in the sun. Finally apply molten red lac. Varnish all over cleanly.

LAC BANGLES.

Grind white dammar to fine powder and add a little mustard oil. Then pound with a hammer adding water little by little. When the mass becomes sticky mix with it very fine husk meal. Pound the mass again with a hammer. Paste a quantity round wire rings prepared as above. Dry and finally apply lac varnish.

MIRRORED LAC BANGLES.

Break a piece of glass into small bits. Spread a zinc leaf on a plain table and besmear it with any varnish. Now strew the glass bits over this and they will all adhere to the leaf. On being separated from one another tiny mirrors will be produced.

Next paste a quantity of lac composition prepared as above on wire rings in a flat manner and press some mirrors against it. The underside of the glass pieces should be pasted on the lac with the help of pincers while the composition is still soft. Allow them to harden.

Alta.

(Simple)

Cotton pads soaked in red dye are known as "Alta." These are used by female barbers in painting the feet of Indian women.

Dissolve scarlet dye 1 oz in water 1½ seer. Arrange some cotton pads on a wooden plank and soak them in the dye solution. Store away when dry.

ALTA.

(From lac dye)

Make some circular pads from well-carded cotton 4 ins. to 6 ins. in diameter. Place them on a wooden plank and soak them in lac dye as obtained in the process described below. Both sides must be thoroughly drenched. Finally dry them.

ALTA.

Brazil wood	2 oz.
Alum	½ ,,
Cream of tartar	½ ,,
Clean water	1 sr.

Chop the wood into fine chips and digest them in boiling water. When only half is left add alum and tartar. Remove when only ¼ sr. is left. Soak the cotton pads in this colour extract for 3 or 4 times.

LAC DYE.

Grind thoroughly 1 sr. seed-lac; add 2½ srs. water and boil. Remove when only half is left. Strain and keep aside the solid residue. The claret coloured liquid is the lac dye in which the cotton pads for making "Alta" are to be soaked as described above. The solid residue is known as washed seed-lac or *gand* and is used in manufacture of shellac.

SHELLAC CAKES.

Washed seed lac (gand) 1 sr.: black resin 1 sr. Mix and melt. Pour on plantain leaves in thick cakes.

(2)

Washed seed-lac (gand) 1 sr. ; black resin 1½ seers. Melt and add 2 ch. vermillion in powder form. Pour on plantain leaves as above.

SHELLAC FLAKES.

Washed seed-lac (gand) 1 seer ; resin 1 seer. Melt together. Have ready a smooth plank well oiled. Pour the molten mass on it : roll out with a rolling pin as thinly as possible. The flakes will form good shellac.

(2)

Washed seed-lac (gand) 1 seer ; and black resin 1 seer. Mix these two ingredients thoroughly and melt them over fine in an iron pan. When they have mixed, stir them vigorously with a wooden stick and add one chittak of red lead. Now spread plantain leaves smooth sides up and besmear with a little oil with a piece of cloth. Then pour the molten mass in thin flakes on the leaves. These are known as shellac.

Hair Dye.

Bray nilotpala flowers to a paste with milk and bury it in the ground for one month. After that period it is used as a hair dye. The grey hair will turn black even if it is applied twice a week.

(2)

Emblic myrobalan	1 sr
Sesamum oil	5 srs.
Emblic myrobalan juice	4 srs.

Bhimraj juice	4	srs.
Fine iron dust	½	,,

Put these ingredients in an iron pan and place in the sum for three months. Then apply on the hair daily.

(3)

Procure the following ingredients: roots of white akand 2 ch : pounded myrobalan 2 ch scraping of iron rust 4 ch. Boil them in 2½ srs. of water. When the colour has turned deep and only half seer is left, remove and strain. Add 1 ch. powdered ferrous sulphate and store away in an iron pan for 20 days. Mix a little in the hair oil used in toilet and apply on the hair.

(4)

Emblic myrobalan	1	sr.
Belleric ,,	1	sr.
Emblic myrobalan juice	16	srs.
Bhimraj juice	4	srs.
Nilotpalas	4	ch.
Kernel of mango stones	1	sr.
Indigo wood	1	sr.
Caps of marking nut	4	ch.
Ferrous Sulphate	½	sr.
Iron filings	1	sr.
Blackberry	1	sr.
Surma	4	ch.
Lodhwood	½	sr.
Kesutya	½	sr.
Oil of Black Sesamum	5	srs.

Put all these ingredients in an iron pan : place in the sun for three months. Strain. Apply the decoction to the hair.

(5)

The three myrobalans each 1 ch ; iron dust 1 ch : Bhimraj juice 4 ch : Grind these ingredients together in an iron slab. Then mix a quantity of sheep's urine and apply to the hair.

Incense Sticks.

(1)

Aguru 1 ch., sandal dust 1 ch., camphor 1 ch., gugul 1 ch, cassia leaves 1 tola., deodar wood 1 tola., jatamansi 1 tola., costus root ½ ch., vetiver root 1 ch., white dammar 2 ch., nagarmoth 1 tola., sugar cane molasses 1 tola.

Mix these ingredients together ; add 4 pieces of lakhi and soak for 3 days. Then grind well into paste and make into incense sticks.

(2)

Aguru 1 ch., white dammar 1 ch., gugul 1 tola., sandal dust 4 ch., lakhi 1 piece, cane molasses 1 tola, cassia leaves 1 tola.

Mix them together and grind. Make incense sticks from the paste.

(3)

Dried rose petals 4 ch, olibanum 1 ch., camphor 1 tola, priyangu 1 tola ; costus root 1 tola, dammar 1 tola, gugul 1 tola, cassia leaves 1 tola, cardamom major 1 tola, myrobalan 5 pieces, lakhi 4 pieces.

Mix together, grind well and form sticks.

(4)

Musk ½ tola, saffron 1 tola, aguru 1 ch, nilotpala 1 tola, benzoin 1 ch., dammar 1 tola, gugul 1 tola.

Grind together these ingredients.

Glossary.

Aguru—Agar : aloes-wood.
Akanda—Calotropis gigantea : swallow worts.
Asana—Terminalia tomentosa.
Bhela—Semecarpus anacardium : marking nut.
Bhimraj—Wedelia calendulacea.
Dhup—Dammar.
Gugul—Bdellium.
Jatamansi—Nardostachy jatamansi, Indian spikenard.
Kesutya—An indigenous herb used in staining hair.
Kur—Sanssurea lappa : The Costus.
Laban—Olibanum.
Lakhi—A variety of round oysters much used in perfumery.
Lodh—The Lodh Tree : Symplocas racemosa.
Nagarmoth—Cyperus pertenuis.
Neem—The Margosa Tree.
Nilotpala—Nymphaea stellata.
Priyangu—Aglaia roxburgiana.
Surma—Ore of lead sulphide used in collyrium.

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Arts & Crafts of India Exhibition,--Delhi.

(From Our Own Representative.)

THE Arts and Crafts of India Exhibition, Delhi (1924 25) has been organised by the Indian Industries Federation of Calcutta with the object to improve commerce, trade and industries of India and also to bring together merchants, traders and manufacturers representing the chief industrial interests of the country with a view to encourage friendly feelings and unanimity amongst them on all subjects involving their common good.

The exhibition (contrary to its name) is open to every article of trade and industry whether manufactured in India or imported from abroad.

The lay-out and plan of the exhibition is very attractive and the authorities have very judiciously classified the stalls in the exhibition.

Messrs K C. Bose & Co. Sham bazar, Calcutta exhibited Biscuits. Mr. Mohammad Mir, Mori Gate, Delhi has sent a carpet 200 years old. Messrs Patnimal and Company, Lucknow Art Palace, have exhibited brass scale of the type of Janter Manter, and they have offered a prize of Rs. 200 to any one who can give the history of the same. Mr. M Ali Akhtar has exhibited fine model of paper and mica with bronze leaves priced Rs. 1500. It appears to be of marble and is very beautiful. Wooden toys have come from Messrs K. S. Attudune & Co Mellore, Chintapana, S. India. Leather goods and bexes are being exhibited by the Indian Leather Goods Manufacturing Company, Shahpur, Belgaum Their hand bags, attache cases, suit cases etc., compare very favourably with anything imported in the line. Hosiery goods of silk, wool and cotton are being exhibited by Messrs Eastern Hosiery Works, Kucha Seth, Delhi while those exhibited by Messrs The General Industrial Co. Ltd. Katia Mashru, Delhi are the best of any hosiery goods so far manufactured by any Indian firm and they even excel the imported goods. Stinsmalla Bros., of Ludhiana have also exhibited very fine hosiery goods, while Hussainuddin Fazaluddin of Ludhiana have exhibited very nice designs in Asans and beautiful carpets. A beautiful silk carpet is exhibited by Master Hashmat Din of Ludhiana. Messrs Mahabir Kewalram of Delhi have exhibited most beautiful designs in gold embroidered curtains; the workmanship is praiseworthy, Mr. Munna Maharaj, of Chauk Bazar, Phulawali Gali, Lucknow excels in the well-known Lucknow Chikan work, Messrs Nunnalal Uggarsen of Meerut City have sent very fine and thin Ban. Mr. Martur Mohammad has exhibited most beautiful designs in shawls and head wear. Harmonium has been exhibited by Mr. Indar Singh, Nai Sarak, Delhi while another novel harmonium with new improvements and inventions has been sent by Messrs Abdur Rashid & Sons, Harmonium makers, Bazar Seb, Agra City. Shrimati Prempiari of of Gandi Gali. Delhi, has exhibited many finely embroidered things and sarees each exquisitely finished.

Matches have been sent by The Start Match Factory and appear to be well finished; they are well appreciated by the public. Messrs Rahmat Elahie Akhtar Said, of Sadar Bazar, Delhi and agents for Tata's tin plates have exhibited tin sheets. The Pandiyan & Co. of Broadway, Madras have sent Parimala snuff.

Messrs Pitamber Mall & Co., of Delhi, have exhibited a very nice carpet of their own manufacture. Mother-of-pearl buttons exhibited by The Tirhut Button Factory are smooth and fine. Messrs Bhopal Sealing Wax Factory have sent very fine sticks and candles of Sealing wax. There is a life-like model of Akbar made of clay about six inches high, said to be 500 years old. Bengal Perfumery & Industrial Works of Strand Road, Calcutta have sent their scents and toilet goods, which appear to be of a superior quality. Himani face cream and other toilet goods of Messrs Sharma Bannerji & Co. are also exhibited, where, besides these a very curious specimen of wood cut of God and dragon has been exhibited (Rs. 300.)

Scouts have displayed some of the paintings, drawings, and furniture of scouts from various places. They have exhibited a ladder made of the scouts rods, and ropes, a bridge for crossing a river. Similarly a man crossing the river upon a cross rope ; scouts getting down with the help of a rope with a chair knot which supports him and he feels as comfortable as in a chair ; all these models have been very finely arranged besides which they have a book stall where literature in connection with scouting is sold.

Nice shirts, bed steads, a double-sided coat which can be put on from both sides are exhibited by the scouts; besides faithful and life-like pencil drawings of Dr. Rabindra Nath Tagore, Madan Mohan Malviya. Fine woven bed covers, sheetings and other piece-goods are manufactured by the widows of the Sewa Samiti, 9, Bank Road Allahabad. A fine cap is being exhibited by a student of the Government High School, Bareilly, in addition to two very beautiful stationery cabinets and numerous other things from Town School, Saharanpur and scouts of Muradabad, Mainpuri and Aligarh and amongst their collections are Cigarette pictures and boxes, stamps, medals coins crayons and models of cottages.

CHEMICAL SECTION.

Bhaiyon Ki Dukan, manufacturing perfumers, Dibbi Bazar, Lahore, were exhibiting their well-known scent flower, scented betel-nuts, masala pan etc. Messrs Gobind Ram Kahanchand, of Kasera Bazar, Lahore, were exhibiting their well known Kahan Amla Hair oil. Messrs Bhagwan Sing Teja Singh, Hall Bazar, Ahluwalian Street, were exhibiting their well-known auto-flower and it appears to be the best of the scents exhibited there Dr. M. C Guha was exhibiting Teel Taila of Messrs G. Ghose, 20, Upper Circular Road, Calcutta and Dacca he was also exhibiting the biological injection products of The Bactro Clinical Laboratory, 63-3, Mirzapore Street, Calcutta. Messrs S. S. Sondhi & Sons, dealers in perfumery, grocery and aniline colours, embroidery and lace merchants were also exhibiting their goods at the exhibition. Messrs Gaekwar Oil and Chemicals Ltd., of Gwalior were exhibiting their oils, paints, disinfectant. Messes B. P. Haldar & Sons, of Benares Cantt, were exhibiting patent medicines, emulsion and syrups. Balbabar Office stall attracted a large number of visitors. Dr. R. S. Sharma, The Ramban Pharmacy, Billimaran Street, Delhi also attracted a large number of visitors. It is claimed that their Ram-tel instantaneously cures all pains, aches, inflammations, and checks oozing of blood and similar ailments. Messrs Dharmakshak Soap Factory of Delhi were exhibiting their soaps, pefumes, and calendars,. Messrs Alankar Soap Factory, Burn Bastion Road, Delhi and Golden Soap Factory were exhibiting their soaps.

FURNITURE SECTION.

The English Warehouse of Kashmiri Gate, Delhi lead the rest in beautiful and up-to-date furniture and upholstery. Their drawing room set costs Rs. 2,000 is acme of comfort, beauty, style and finish. They have got a bed room suit worth Rs. 1,500. The Reliance Trading Co., of Kashmiri Gate, Delhi are also exhibiting their furniture and so are M. Gopinath of the same place. Their pair of couch with brass parts and spring bed and baby cars attract attention. Messrs Adam Sajan & Co, of Kashmiri Gate, are also exhibiting very fine furniture. The Wood Work Manufacturing Co. Ltd., Gwalior are exhibiting their furniture silver and aluminium wares. Municipal Board Industrial School of Tiraha Bairam, Khan Faiz Bazar, Delhi has exhibited furniture and other articles made by the students of the school.

They leave nothing to be desired either in design or workmanship; all the things are highly finished and polished. The products and manufactures of Messrs Allibhoy Valliji and Sons of Multan Cantt. are best in Despatch boxes, Suit cases, Hospital requisites, Jewellery boxes, etc. All their manufactures are well finished and are strong and durable. Messrs S S. Basu & Bros. of 91, Raja Dinendra Street, Calcutta are manufacturers of Crown files, and of Crown compressed fibre attache and suit cases gun cases, etc.

The Model Boot House of Delhi representing the goods manufactured by The Model Industries, Dayal Bagh, Agra, have beautiful leather hand bags, suit cases, holdalls. gun cases. boots and shoes, leather buttons, hospital and laboratory requisites, nibs, silk cloth. They have newly invented a serviceable hurricane lantern like Dietz pattern. Their cutlery wares, knives, door bolts, etc, can favourably compare with any imported material in the line. Agra Chrome Trading Co, 72-14, Bentick Street, Calcutta, are dealers in boot materials and importers of "Jetoil" boot-polish. Delhi Embroidered Shoes Company, 43, Bertram Street, Calcutta, are dealers in gold and silver embroidered slippers, Bath slippers, Indian Saleem shoes, Jaipur shoes, Silk embroidered shoes, Panjabi shoes, etc. Haji Abdur Rahman, Shafique Urrahman of Bazar Safdarganj Rampur State have nice nut-crackers, Knives, etc. of various designs.

CURIOS AND ART.

The Superintendant of Forests, Mines and Industries, Marwar State, Jodhpore. has sent beautiful wooden boxes, brass ware, candle stand, tanned skins, ivory goods, shoes, soldier's belts, wool, Indian medicines, lohis, blankets, Jodhpore shoes, etc. The Swadeshi Shilpa Factory of 212, Cornwallis Street, Calcutta are Jewellers & Manufacturers of ivory goods. They are exhibiting beautiful ivory bangles worked with gold, pictures and oil paintings, natural figures and different ivory works, etc. Their stall is one of the most attractive stalls in the Exhibition. Messrs Manhar Lall Bujan Mall, Jewellers, Chandni Chauk, near Imperial Bank, Delhi are exhibiting a necklace studded with brilliant jewels and diamonds worth Rs. 9,00,000; another Pearl-necklace worth Rs. 50,000; beautiful Kulgy in which the neck of the inlaid peackock nods towards right. They are exhibiting a large stock of pearls, bangles, brooches, necklaces and the like. Mesers P. Veerasalingam & Sons, Ivory works merchants, medalists Vizagapatam (India) are actual manufacturers of fancy articles in ivory, sandalwood, horn and tortoise shell, etc. They are exhibiting a beautiful sandalwood box overlaid with ivory and with beautiful carving, of Vishnu. Mr. Taj Deen Old Indian Curiosities dealer of Kashmiri Gate, Delhi is the only gentleman in this exhibition who exhibited his goods at Wembley Exhibition. He is now exhibiting, old and new silk goods, carpets, old brass curios. stones, necklaces silver ware, pearls and fashionable bangles, fine Kashmir shawls, table covers, bed covers, old shawls, Persian carpet costing Rs. 2,000, a flower vase costing Rs. 2,000. Mr. Abdul Aziz was exhibiting Kashmir papier machie work, fine wood carvings consisting of flower pot stands, screens, tables, etc. Messrs Nawazishali Inamul Haq of

Pilkanthala, Saharanpur Dt. are exhibiting wood carvings of exquisite style. Messrs S. Mohamad Imam Mohamad Ikram, wood carving manufacturers of Saharanpore, are exhibiting Ebony wood Cigarette boxes, brass inlaid and overlaid cigar and cigarrette cases, and handkerchief boxes, and tables, folding chairs and lampstands, overmantles, tea tray tables, etc. N. Abdulsalam Nurahmad & Co., manufacturers of carved wood works, of Shahbehlol Pilkhantalla are exhibiting, boxes, tables, trays, screens, brass inlaid furniture. Multan Enamel Fine Art Works are exhibited by Messrs Mangaldeo Dhanpat Rai & Co, inside Delhi Gate. Multan City, who were also exhibiting coat buttons, studs, rings, boxes, brooches, hoppins, buckles, etc. Messrs Roshanlall Murlidhar & Co, silver enamel merchants, Chaukbazar, Multan City, Punjab are also exhibiting Multan enamel jewellery goods of fine workmanship. Messrs Rupchand & Co., are displaying Enamel Jewellery of this manufacture. They have tea cups, boxes, surmadanees, finebelts, buckles, headpins, buttons, etc. Stone necklace merchants, Phatak-Haris-Khan, Delhi are exhibiting a large variety of multi-coloured beautiful stone necklaces. L. Bhagwandass Purani Idgah, Brassware merchant, Delhi is exhibiting carved tables, chess tables, suspending brass monkey, inkstands, etc. Messrs Noorbux Khudabux of Jaipur State, Rajputana, is exhibiting Charpoy legs of silver with exquisite workmanship worth Rs. 4,000; also brass trays flower pots, enamel works, embroidery work, old clothing and chaugas, belonging to old kings, carpets, hand paintings, and books. Messrs Manoharlal Baromal, of Dariba Kalan, Delhi is exhibiting brass toys for children, dolls, etc, woollen goods, hosiery goods, mufflers, etc. Messrs Mohammad Hussain Khurshed Hussain, Dealer in Indian Arts and painting on Indian ivory, Kucha Rehmman, Delhi is exhibiting a very large collection of fine paintings, and miniatures in his gallery. Taj Mahal, Nurjehan, Akbar and all other works are specimens of the best paintings. Messrs Mukhtar Ahmed Tufel Ahmed, of Mukhtar Buildings, Mohalla Shah Belol, Pilkhantala, Saharanpore, are exhibiting furniture of carved wood, including tea-poys, trays, screens, chess tables, etc. etc L Girwarlall stoneware merchant, near Shahganj Ruiki Mandi, Agra is exhibiting elephants, toys, inkstands, models of Taj Mahal etc. The Photo Service Co., Kashmiri Gate, Delhi are exhibiting Photo goods and photographs; Pearl Factory Malayanagar, Jessore, Bengal are exhibiting, their facsimile reliefs of Gods and leaders of men and attracted a very large number of visitors. They are exhibiting mother-of-pearl images of Budhha and Christ and idols of Gods, and goddesses besides fancy articles. The East Indian Button Manufacturing Co., 71, Canning Street, Calcutta, are exhibiting Dacca mother-of-pearl and horn buttons, brooches, flowers, charms, bulb buttons, butterflies etc., ear-rings, shirt buttons, stud links, etc. Their products have been unanimously approved The Calcutta Horn Manufacturing Co., 91 C, Shimhubatan Lane, Entally, Calcutta, are exhibiting beautiful combs, shaving brushes, etc. Messrs Salim & Co,, Fatehpuri, Delhi are exhibiting Electric toys and novelties, etc. They have Electrical fancy goods, table lamps, batteries etc. Messrs K. A. E. Dake & Co, Calcutta are exhibiting a large number and varieties of balloons of different shapes and hues and the children muster strong round this stall. Messrs Jagge Bros, Portrait agents, Delhi are exhibiting most beautiful coloured photo enlargements.

BRASSWARE.

H. Mohammad Hussain Mohammad Ibrahim, Brassware Merchants of Moradabad are exhibiting a large number of novel design in brassware; their fruit baskets, inkstands, flower vases, jugs, dishes trays, etc., are selling at moderate rates.

The Ornamental Brassware Manufacturing Company as the name will show are exhibiting ornamental brass wares, and toys.

Messrs M. J. Warsi & Sons, Artistic Brassware manufacturers, Moradabad are exhibiting fine Jewellery or Cash boxes lined with velvet, a centre table finely worked with black Taj in black enamel. Messrs Ganeshilall, Jwala Pershad, Moradabad are exhibiting a very fine shamabar worth Rs. 200, Tea sets, tumblers, spoons, forks and household utensils, Messrs Abdulmajid Alibux, Mohalla Bara, Moradabad, are exhibiting a large stock of Tea Kettles, Candle Stands, Dishes, etc Messrs H. Mohammad Hussain Mohammad Ibrahim are exhibiting brassware. Messrs Ganeshilall Kanhayya Lall, Bisramghat, Muttra are exhibiting very fine brassware. Messrs Benarsi Dass, Chandni Chauk, Delhi Brassware merchants are exhibiting fine Gulab Pash.

FABRICS.

Mr. S. S. Tandon's Silk Weaving Factory, Shahjahanpore, was exhibiting finely woven and novel design shirting materials, Turban cloths, Durries, etc. Their products are well finished, of attractive designs and in various gaudy colours.

Messrs Abdul Rashid Khan Abdul Aziz Khan, Shahjehanpore, Mohalla Tarin Tikli, were exhibiting attractive designs in carpets.

Messrs Kabirchand Nemchand, Jain of Chandnichauk, Delhi, were exhibiting, Christy's and Italye caps also Turkish caps. Messrs Hira Knitting Factory of Almora were exhibiting stockings, etc Messrs General Industrial Company Ltd, Katra Mashru, Delhi—the hosiery products of this firm deserve special attention. They are manufacturers of high class socks and stocking, of cotton silk and cotton, L. Ratanlall of Baidwara, Delhi is displaying beautiful silk embroidery work on sarees. Messrs Ghisumal Jain, Sadar Pabari Dhiraj, Delhi, are displaying a variety of sarees of Benares, Beaded gold and silver brocaded, Surat sarees, and gold and silver work caps, etc. of novel designs for all tastes. Messrs Uttamchand Babulal of Tikonia Bazar, Agra are exhibiting a large number of valuable qualeens, galichas, carpets, some of which are worked with silk & Kalabattu. Messrs Mahabir Swadeshi Stores are exhibiting the well-known goods of Chandgiram's Weaving Factory of Rohri, including, shirtings, Karandis Cordinets, Suitings, Sarees, Quilt coverings, Table covers, Kashmir bed covers, Pillow cases, all very attractive in colour, finish and design. The Lucknow Art Palace were exhibiting, Chikans, Embroidered quilt covers, Handkerchiefs, Kashmir shawls Lucknow Chikan-work and Printed work, Benarasi sarees, Jewellery, Embroidery work, Scarf, Bags, Cashmir wood work screen worth Rs. 1,200 They are also exhibiting silver and golden threaded work such as sarees, coats, caps, etc. Messrs Hiralall Chunilall of Kinari Bazar, Delhi are exhibiting silk sarees, laces, girders, etc., Messrs Vithaldass Chunnilal Jariwala 95,99, Bhuleshwar, Bombay are exhibiting the most attractive embroidery work on sarees both hand work & machine work; their exquisite designs are very attractive. Messrs Purshottamdas Murlidhur Naisarak, are exhibiting, Asans, quilt coverings, durries, prints, etc. Messrs Mahbub Ali Abdulla & Co., Silk goods manufacturers, P. O. Champanagar, Bhagalpore, are exhibiting silk pieces for shirtings, tussores, silk and cotton mixed work, coatings, sarees, lungis, pugrees and chadars. Messrs Lakshmi Narain Ganpat Rai of Shahanshahi, Katra, Delhi are exhibiting, Dhoties, Saries, both of silk and cotton. Messrs The Mohta Felt Cap Factory, Delhi, Shadara, was exhibiting quite satisfactory caps, in a variety of sizes and designs. They were displaying Hungarian, Bangalore, and Turkish felt caps.

Messrs Seth Kapur & Co., were exhibiting various kinds of mother-of-pearl, and leather buttons, laces, borders, shoes made of cloth, velvet slippers, etc. Messrs Khan Brothers, of Sanitary Road, Lucknow, are exhibiting a very large stock of chikan work goods, they lead all the rest in designs, their stall attracted a very large number of visitors from the rich class of Delhi and their goods were very much praised and appreciated. They are the manufacturers of the famous Lucknow needle work. Also Gold and Silver thread work. They have a large variety of printed Jamawars on silk, cotton and wool.

The High Class Fashionable Cloth Manufacturing Co., of Ludhiana were exhibiting a large variety of silk Izarbands, gold and silver thread work on sarees, caps, etc., Messrs Kishenchand & Sons, Chandni Chauk, Delhi the well-known jewellers of Delhi ware exhibiting a large stock of valuable Kashmir shawls both new and old. They deal in Kashmir Namdas, and all sorts of Embroidery work.

MACHINERY.

Messrs B. D. Berry & Co, of Queens Road, Delhi are exhibiting Oil Engines, Rice hullers, Saw benches of Standard type, also their own make Berry oil engine Messrs The Singer Sewing Machine Co., are exhibiting their different models of sewing machines worked by hand treadle machines and also those worked by treadle or electric current, (128 K); they are also displaying a 30 K 15 Industrial machine for leather goods besides a large variety of machines for sewing canvass, making borders, stitching, hemming, embroidering, and for fancy work, gauze work, hand stitching, etc. The Dalhousie Dairy of Delhi Kashmiri Gate are demonstrating Vega Butter making machines and cream seperators. The Oriental Motor Car Co., are showing the well known Ford Cars. Messrs G. Mackenzie & Co, of Dufferin House, Delhi are the agents for Overland, Willy's Knight and have exhibited a number of cars and a large stock of accessories. Messrs Bhanamal Gulzarimal, of Chawri Bazar, Delhi are the leading Iron merchants of Delhi, they are exhibiting their cane crushing mills, cements, hardware. Messrs. Bahri & Mandal Ltd., are exhibiting the Gritzner (German Sewing Machines) toys, Adler Typewriter, Camera and Photo goods. Messrs H. P. Lall & Sons are the agents for the world reputed Jones Sewing Machines. Messrs. P. D. Nalaso are demonstrating their Cycles, Trycicles and Cycle accessories. Messrs Chunnilal & Bros are demonstrating their embroidery machines.

SURMA.

Messrs Shiv Dayal Rupchand, Bara Mohant, of Dera Ismail Khan are selling their Surma Momira and so are Messrs Uttamchand Jaitha Nand. Messrs Shiv Dayal Shamlall, Messrs Bhagat Beharilall Mohanlall Gaddinashin, Messrs Bhagat Asanand Beharilall all of Dera Ismail Khan

MISCELLANEOUS.

The Allahabad Chemical Works, Naini are exhibiting Chutnies, Pickles, Jams, Jellies—these are professed to be made by up-to-date scientific methods. They are also exhibiting soaps, hair oils, pharmaceutical productions of high quality. Allahabad Tile Works, Naini are displaying roof tiles both single and double, of English pattern The Allahabad Glass Works, Naini are exhibiting soda water bottles and phials etc. Their soda water bottles both with the Crown cork and the ball are nicely made and compare favourably with the imported bottles. The Modern Chemical Works, of Nicholson Road, Delhi are displaying a large stock of Essential oils, Liquid colours, Fruit and artificial essences. Messrs. S. K. Legrand & Co., of Kashmiri Gate, Delhi are exhibiting various kinds of spectacles and eye and glare glasses. Messrs Devi Prasad Sunderlal Khatri Kanauj are exhibiting a large variety of scents.

The Companion Cooker Works of Delhi is making headway. The cooker is very beautiful and complete with all the requisite utensils Messrs Perfect Pottery Co, Ltd of Jubbulpore is displaying brautiful fountains, flower pots, sinks, lavatory, fire clay, pipes, garden chairs, roofing tiles, flue covers, latrines, seats, wash tubs, urinals and electric materials of all sorts. Messrs L. Jotipershad Jaini C/o Messrs Badridass Jankidass, Chawari Bazar, Delhi is exhibiting Chunar pottery, of high class. His Tea sets, Idols, Models, Flower Vase, Beasts, Inkstand, etc. are all beautiful. Messrs Sutna Stone & Lime Co, Ajmeri Gate, Delhi are exhibiting the well known Sutna lime.

The Calcutta Mineral Supply Co., 31, Jackson Lane, Calcutta are exhibiting some beautiful Grecian figures and busts also samples of Kaolin or China clay, Soap stone, Plaster of Paris, Quartz sand, etc.

Messrs Hiralall Bhargava & Co, are exhibiting the various qualities of paper manufactured by The India Paper Pulp Co Ltd ; they are also displaying the samples of bamboo from which the paper is made, also the chipped bamboo, paper pulp (un-bleached), Bleached paper pulp, and also coloured paper pulp. This gives the visitor a rough idea of the various stages the bamboo undergoes before it is finally turned into paper.

Messrs G. Prasad & Co, 720, Dayaganj, Delhi are actual manufacturers of sports goods, durable hockey sticks, nice cricket and tennis bats. They are also exhibiting their cricket balls and footballs of exceptionally good qualities.

The art gallery was profusely decorated with pictures and one is simply wonder struck to see the paintings of Mr. Allah Bux, Artist, Rangmahal, Lahore. His life-like representations of Lord Krishna, Enjoyment and Offering are worth seeing. No admiration can do proper justice to the paintings of Mr. S. N. Dass, Khurut, Howrah. Some of his works are Sree Krishna, Humble Bee, Exile, Elopement, Gold Fish, and Devotion. The various paintings of Mr. S. Ukil, 4 287, Esplanade Road, Delhi are exquisitely done ; specially his "Flight of Basdeva with Krishna" (Priced Rs. 1,000). Besides these there were numerous other pictures from various other artists. The painting "Devoted Radha" exhibited by the Art Publishing Company, 19, Harrison Road, Calcutta, is admirable.

Dairy Farm in the Coalfields.

IT is, I presume, admitted by every one, who has the bitter experience to pass his days especially in Jharia Coal field, that it very badly needs an up-to-date Dairy Farm with the combination of stock and poultry farm The growing needs and inconveniences require some kind of a Farm to be started at a central and convenient place and the same to be worked on English or American methods.

With a Dairy farm one must combine a Stock and a Poultry farm to make it remunerative and if possible a fishery. It seems, of course, at first sight a big undertaking, no doubt, but it can easily be effected if some businesslike youngman comes forward to carry out the scheme forshaking their long imbibed hankering for services and utilise half of their energy and intelligence that are given in the performance of their so-called service.

A Dairy farm may be worked on co-operative lines if it cannot be started by a single capitalist. The capital should, in this case, be as large as possible. as it has to be considered that the needs of Jharia and its adjacent coal fields are growing day by day and a small business would be ineffective. The larger amount should, I believe. yield a good profit.

Naturally, the area required for it would have to be large and when ground is taken it must be so situated that extensions can be made if required. A portion of it would be paddy lands, as the straw will do for the cattle and the rice in ration for the employees and other stocks. I would say it would be better to start a business of this kind with 300 or 400 heads of cattle and add good animals as they can be procured, 1000 sheep, the same number of goats, 50 pigs and poultry. The experience of others show that it must be a Dairy farm as well as a Stock farm, i e , sheep goats, pigs, poultry of all sorts and a fishery.

The farm must be near a railway station and the Grand Trunk Road, if possible, and a river, creek or *khul* for fishery yields a good profit, if even from the tank. The ground will have the importance of fruit and vegetables, which are practically not available even to meet one's daily dishes.

Amongst the share-holders, it would be an important point to have Graduates of Veterinary and Agriculture and the farm should be in their charge as more lively interest can be expected from those who are pratically trained in the matter than that of paid servants and the only principal point would be to have honest and good management.

Keeping the above ideas in view for a long period I place it to my countrymen through the medium of your esteemed journal with a hope that it will receive the attention of some one to carry it into effect.

—BY MR. M. DAS GUPTA,
Bhowra, Jamadoba P. O.

Roller Composition for Printing.

THE subject of preparing roller composition for printing business is a most important one. Every printing press requires roller month after month and the old system was to melt glue and cast the rollers with a little jaggery mixed with it. But these rollers are too soft when cast and get very hard if kept unused for a short time. Washing the rollers every day, keeping them over tubs of water specially constructed for the purpose are among the measures adopted to keep them in good condition Alterations of temperature have a large effect upon the glue roller. In summer it is almost impossible to keep it in proper order. I remember the days when I was exposing my rollers all over the night in the open It need not be said that the condition of the roller determines the quality of printing. Ready made roller compositions are sold by several leading firms in England and America and the rollers cast out of these patent preparations stand the changes of temperature in our country and work equally well in all seasons Rubber is not apparently used for making the rollers, because the oily nature of the different inks used corrodes them away. However, the old inner tube of a bicycle when used as a jacket to the treadle platten machine rollers admirably suited well for any fine work, and I even print half-tone blocks with those rollers

Coming to the printing machine• at least a hundred pounds of composition is required for its rollers This means an expense of nearly two hundred rupees to be repeated at least once a year. It was my ambition to save the printer of this expense. Therefore I commenced to make my own experiments and the results are as noted below.

(1) Glue soaked overnight in water gets softened by the morning. Heated over a water bath it melts without the addition of any water and assumes a semi-fluid condition in about 15 minutes. This if cast as a roller will be very soft like a jelly and would dry up into a hard mass in course of time. If the heating is continued it can be brought to a stage when useful rollers can be made out of it but these rollers require constant care as stated above.

(2) Sugar or jaggery when mixed with one fourth of its weight of water and heated till the first printing is over, makes syrup which if kept will never solidify. If the heating is continued the sugar will assume such a condition that it makes a very hard mass when cooled. To test this, small quantities of the boiling syrup can be put into cold water and result tested.

(3) Remembering the above two principles we can proceed to cast the rollers. I prepared molasses out of a pound of the best factory sugar and bottled it. I soaked one pound of glue in water till it became soft, and after it is softened heated it on a water bath till it melted keeping it stirred all the while. I then added the molasses and continued the boiling until the whole mass was thickened and was fit to be poured into the mould At the last stage I added an ounce of glycerine just before removing it from fire. This course yielded two pounds of composition and the rollers made out of it seem to work quite satisfactorily.

Coming to the cost one pound of glue is worth 8 annas; the sugar 3½ as. and the glycerine about 3 annas. The total comes to about as 14½ or to a rupee approximately. This works out at the rate of about 8 annas for a pound of composition, and when compared with the price of the ready made composition the saving is about 250 p. c. I wish that my brother printers would carry on further experiments and let me know the results for the benefit of all.

—By Mr. V. S Padmanabharaju, B.A.
Proprietor, The Albert Printing Press,
Suryaraopeta, Cocanada.

Ideas for Small Capitalists

Vermicelli Making.

Mr. D. G Kajulu, The Gauthama Medical Hall, Bezwada, Dst. Kistna sends us the following :—

Most of your readers know that the use ot vermicelli is becoming very popular both in the hotels and restaurants as well as in the Indian household and consequently the demand for it also is rapidly increasing. All that is required for making a start with this industry ,is a small, smooth plank of wood about a yard in length and a foot in width and some dough made out of wheat-soji. The dough is made by mixing the wheat soji with water into a hard ball and then pounding the ball with the ordinary wooden or iron pestle and stone mortar. until it becomes soft and loose and we can easily draw a fine thread from it.

Then the person drawing out the vermicelli should squat on the floor, place the plank of wood before her, raised about a foot from the ground by resting either pair of its breadthwise ends on something so as to form a bench. (In fact if one can afford to procure a bench with plank, of the dimensions given above, and about a foot in height it will serve the purpose very well). The breadthwise ends should be to her left and right hand sides and the lengthwise ends opposite to her.

Then she must roll the dough into a long roll with her hand, something like the carded cotton ready to be spun into yarn by the charka. After this the left end of the roll of dough is rolled by the right hand, pressing the hand, while so doing, a bit firmly so that it (the end of the dough) lengthens into a thin string 1/20 of an inch or less in thickness. From time to time oil or ghee must be applied to the fingers so that they may not stick to the thread or the thread to the plank. When the string is five or six inches long she must hold its end in the left hand until it is long enough to reach the shallow plate of metal, bamboo or cane about a foot in diameter which she places to the left side of the plank. As the string thus continues to draw forth she must wind it round closely on the plate, one circle outside the other, beginning with the centre so that the circles of thread may not overlap and thus the vermicelli clod. This continues until the dough is completely finished. When the plate is full its contents are dried in shade and when it is dry it comes out in thin cakes and is ready for use.

The capital required for this industry is almost nothing. Every house, even the poorest is sure to have a small low stool as one of its indispensable pieces of furniture. If any housewife hasn't got one she may borrow one from her neighbour. The only capital required for her is for purchasing the wheat soji. For a weighing viss of vermicelli the quantity of soji required is 1$\frac{3}{4}$ of measuring seer The average cost of 1$\frac{3}{4}$ seers of soji as. 8. In one day a woman can conveniently turn out one seer of dough into vermicelli leaving plenty of time for her domestic duties, meals and other deviations. In seven days she can turn out seven seers of dough into vermicelli i.e. prepare 4 visses or Rs. 6 worth of vermicelli. Deducting the cost of the soji her nett earning per week is Rs. 4, i.e , above Rs. 16 per month. The expenses may be much less if it is prepared out of wheat flour or American flour, i e., corn flour. But the demand also will be less owing to the inferiority of the quality.

Book Binding.

Mr. Ramchand Saini, Chauna Mohalla, Greenwood Street, Sialkot City sends us the following.

Easy hints on book-binding are here laid down, which will furnish suitable work for young people. It is quite possible to bind books really well without the aid of machines, but certain tools and implements are necessary. They are commonplace with the exception of the hammer and the pressing and backing boards. A shoemakers' hammer may be made to serve the purpose and the students' box or trunk may be used as the press

There are a few technical terms for a beginner to learn to be able to clearly understand the directions. The four edges of a book are: the top is the "head," the front edge the "fore-edge," the bottom the "tail," and the foufth-edge "the back." To make all the sections level knock the "head" in the same way. This process should be repeated several times with the head and back and the other edges will obviously be right if these two are straight and level. This is "knocking up."

Draw a pencil line across the back of the sections 1" from the tail and another one half from the head. Make a cut upon each of these lines. Find the centre of the back between the two marks with the dividers. See that the sections follow one another in proper sequence before sewing. Open the section at the centre, place the left hand in it and lay it with its book to the tapes, bringing the marks to their proper place against them. The tail should be on the right hand. Thread a needle with a long piece of linen thread, pass the needle from front to back through the cut at the tail, catch it with the left hand and bring it out again to the front at the pencil mark to the right of the first tape. Leave an end of thread at the saw cut. Re-enter the needle at the left pencil mark of the first tape and bring it out again to the right of the centre tape and in again at the left of it. Bring it out to the right of the third tape and in at the left of it and lastly bring it out through the cut at the head. Treating the other sections in the same way tie the thread to the end that was left in the first case, making catch stitches to secure the sections. See that no sheets escape being sewn. Next have at hand some hot thin glue and get together some old book boards or oblong pieces of boards cut, for example, from the side of a box and have plenty of waste paper handy. Bring down the slips very carefully along the sides of the end papers so that they may be caught in and place a piece of board at each side of the book. Knock up the book very carefully before glueing its back Brush over the whole back with glue, getting it well into every section and when it has nearly set strike the edge of the back-gently with the broad end of the hammer all the way along. Turn the book on the other side and repeat the operation till the book has been given a rounded appearance at the back.

The book is now ready for its boards and they should be measured and cut with the knife or strong shears or scissors, and joined with "headbands" or narrow strips of cloth pasted over them across the back and passing under the threads. The book is now ready for its cover which may be of some good-looking cloth, canvas or paper of some beautiful and floral design, coloured "Abri" or morroco etc. etc. Lay it wrong side up, measure the size of the book and rule light pencil lines upon the canvas as a guide and cut out the pieces. Lay the covers on the boards of the closed book by means of good flour paste turning them in at the head and tail. If these instrdctions have been carried out there should now be a strong neat volume very plainly whole bound in canvas, etc. More advanced book-binding matters concern professional tradesmen and are therefore omitted.

Small Trades & Recipes.

To Make Ivory Flexible.

Ivory articles may be made flexible and semi-transparent, by immersing them in a solution of pure phosphoric acid of sp. gr. 1.130, and leaving them there till they lose their opacity; they are then to be taken out, washed with water, and dried with a soft cloth; it thus becomes as flexible as leather. It hardens on exposure to dry air, but resume its pliancy when immersed in hot water.

Photographic Developer.

A French scientist recommends the following formula for a developer for use in hot countries, where it is inadvisable to employ a developing solution containing alkali on account of the greater degree of smelling and softening of the gelatin :—

Diamido phenol hydrochloride	5 gms
Sodium sulphite anhydrous	30 ,,
Potassium metabisulphite	10 ,,
,, bromide	5 ,,
Lactic acid	5 c.c.
Sodium sulphate	100 gms
Water to	1000 c.c.

With this, development is rapid and no perceptible fog is reduced. As a further safeguard, plates may be fixed in a fixing hardening bath but in making this latter, it is not necessary to use chrome above in a greater proportion than 1½ per cent.

Hard Stopping for Wood.

Take equal parts white lead (ground in oil) and common putty (by bulk, not weight), mix together. If not required white, stain to any colour required with some ground colour, as Venetian red for red, a touch of umber to this for brown, or ochre for yellow, umber to this for stone colour, etc. Press the putty well in with the knife to get it solid, let it stand two or three days to harden, then rub over with fine sandpaper.

Blueing Gun Barrels

Dissolve ½ oz. hyposulphite of soda in 1 lb. of water, and to it add ½ oz. acetate of lead, previously dissolved in ½ lb. of water; place the articles to be blued in this solution and heat it to nearly boiling, but it should not quite boil. A sulphide of lead is formed and deposited on the articles, if of iron, a steel blue colour is the result.

Wax Flowers.

Wax flowers are made from sheets of prepared and coloured wax sold for the purpose. The petals are cut with scissors (wetted to keep the wax from sticking to them) and rolled to the required curvature in the hollow of the hand with suitable appliances. Tinting is done with dry colours, and brushes sold for the purpose For stems, wire covered with cotton is used. To form a flower a loop is made at the end of the wire and covered with scraps of sheet wax as a foundation, to which the petals are attached by pressure. There are dodges for making leaves, such as punching them out with tin cutters, or squeezing them in plaster moulds taken from real foliage, but the really artistic method is to cut and mark them by hand, giving to each an individual character.

SCIENTIFIC & INDUSTRIAL TOPICS.

Margarine and Malnutrition.

Since this compound of refined animal and vegetable fats has become established as a staple food in the West it is interesting to learn the claims made about its dietetic properties. Through chemical analysis and feeding experiments, margarine has been subjected to modern scientific tests which have demonstrated beyond question its high nutriment value. The importance of fats in the human diet has long been recognized. Fats furnish the fuel that keeps the vital organs functioning properly. The invention of margarine has made it possible to utilize as human food wholesome animal and vegetable oils which formerly played little or no part in increasing the world's food supply.

Artificial Hatching of Fish.

The hatching of eggs by artificial heat is well-known in China and extensively practised, as is also, the hatching of fish. The sale of spawn for this purpose forms an important branch of trade in China. The fisherman collects with care on the margin and surface of water, all the gelatinous matters that contain spawn of fish, which is then placed in an eggshell, which has been fresh emptied, through a small hole; the hole is then stopped, and the shell is placed under a sitting fowl, In a few days, the Chinese break the shell in water warmed by the sun; the young fish are then kept in water until they are large enough to be placed in a pond. This plan, in some measure, counteracts the great destruction of spawn by troll-nets, which have caused the extinction of many fisheries. A few drops of a weak solution of permanganate of lime, added night and morning, sweetens water, and supplies oxygen, and thus diminishes the mortality in fish hatching.

Some Explosives!

It is not generally known that flour, sugar, starch or grain dusts are capable of working greater havoc than a high explosive such as dynamite. In a barrel or sack, flour is harmless. But if you were to take handfuls of it and throw it about until the air in the room is full of it, and then light a match, the house might be blown to pieces. Flour is a combustible substance. When a cloud of it floats in the air of a room every particle is in immediate contact with oxygen and a flame or even a spark will cause it to burn. Instantaneously, the whole of it is converted into gas which, expanding in a closed area, blows out the walls. Powdered sugar is also extremely dangerous, while powdered spices, oatmeal, and even soap will explode.

A New Electroplating Process.

The new electroplating process called "Fescolizing" is stated to give improved result in depositing their protective coatings, building up worn parts to be finished by machining, and saving much material. A special claim is that the coating applied is so interlocked and adherent that the two metals joined can be separated only by the tearing of the weaker. After being cleaned in a bath of caustic alkali, the article to be treated is immersed in a patented bath intended to protect against oxidation. Electro-deposition follows subsequently. Articles may be partially coated by covering with wax the parts to receive no deposit.

A New Diving Appliance.

The invention by the Japanese of a diving appliance which dispenses with the use of pumping promises to revolutionise the pearling industry. The new appliance consists of a small mask, with face glass and rubber edge, which covers the eyes and nose. The mask is connected to a cylinder about 16 lbs. in weight, filled with compressed air, which is carried on the chest. The supply of air to the nose is regulated by the mouth, which controls an attachment to a tube conecting the cylinder with the mask. The old cumbersome diving suit is thus dispensed with, and the diver has greater freedom to his limbs.

Essence d'Orient.

The lustrous substance of essence d'Orient, with which the imitation pearls are coated, occurs on the scales of most fishes and gives them their characteristic brilliance. When examined under the microscope this nacreous substance is seen to be composed of various sizes of small blade-like crystals. When the epidermis of the scales is scrubbed off under water the lustrous particles are suspended in the liquid. The crude liquor so obtained is filtered through cheese cloth and allowed to settle. After washing the crude essence several times by decantation, strong ammonia is added and the essence is allowed to stand for a considerable time to permit the digestion of the proteinaceous material. The concentrated suspension is pearl essence.

By other improved methods the lustrous crystals are suspended in acetone, amyl acetate or other organic solvents, which are solvents of the nitrocellulose or cellulose acetate lacquer. Pearl essence lacquer possesses many advantages over the aqueous suspension as it may be applied with a brush like any ordinary lacquer.

Pearl essence is used in the manufacture of many ornaments other than imitation pearls.

Buckles, hatpins, stickpins, watch fobs and many other objects are often ornamented with this, the most beautiful lacquer. It adds a novel lustre to transparent celluloid and bakelite articles. If it were a little cheaper it would find many uses in household decoration.

Minute Earth Tremors.

Four classes of microseisms or minute earth tremors have been distinguished by physicists. Two classes seem to be due to variations of air pressure transmitted in regular oscillations through the sea—in one class from cyclonic winds, while the sharper shocks of the other are registered during anti-cyclones. These tremors have short periods of 2 to 8 seconds. Microseisms due to cold are irregular in form, and have long periods of 1 to 5 minutes. Microseisms of the first and second classes may be superimposed on them. The fourth class is of unknown origin, and consists of waves that are sometimes regular in form with a period of several minutes, and are recorded somewhat rarely.

FORMULAS, PROCESSES & ANSWERS.

Toning Baths for Photo Prints.

2629 B. B L. K. L., Ambala. Asks how to prepare a toning bath for photographic prints.

The sulphocyanide bath is a suitable bath for most printing out papers. Take ammonium sulphocyanide 20 gr., gold chloride 2 gr., and distilled water 20 oz. Dissolve the sulphocyanide in 16 oz of water, and the gold in 4 oz. of water; then add the gold solution gradually to the sulphocyanide solution, stirring the mixture all the time with a glass rod. The prints are first well washed, then immersed for about five or ten minutes in a solution of common salt ½ oz, alum ½ oz., and water 1 pt. Again well wash the prints, and then tone them in the bath described above. After toning the prints, wash them in several changes of water, and then fix in hypo as usual. A fresh bath should be used for each batch of prints.

Lime Cylinders for Limelights.

2713 K. S. B., Karauli. Requests us to describe a process of preparing lime cylinders for lime light.

Lime cylinders for lime-light are either turned in the solid or moulded. For the moulding of lime cylinders, slake perfectly white pieces of quick lime with a little water so as to form a dry powder; wash this several times with clean water, allowing it to settle out, and pour off the clear water each time. Then dry the powder until it crumbles in the hands. Now compress it in an iron cylindrical mould that tapers very slightly towards the upper end, and has a loose bottom with a rod in the centre and a plunger for pressing. On forcing out the loose bottom of the mould the lime cylinder will go with it. The lime cylinder should be dried first at ordinary temperature, and then at a gradually increasing heat, until finally it is made white hot in a furnace. As the lime contracts considerably in heating, the mould should be made larger than the furnished cylinder.

Lacquering Tin.

2567 R. L. B., Bombay. Solicits a good recipe for lacquering tin.

The following is a recipe for a lacquer that will give to tin the colour of brass. Take 3 oz. of seed lac, 2 dr. of dragon's blood, and 1 oz of turmeric powder, and place in 1 pt. of well rectified spirit. Allow to remain thus for a fortnight, but give the bottle a shaking up at least once each day When thoroughly well combined, strain the liquid through fine cloth. The tin-ware to be lacquered must be dipped in dilute acid to remove all dirt and grease, and dried over a charcoal stone. It is then ready to receive the lacquer which is brushed over in the ordinary way.

Making Fly Papers

2671 H. S. S. C., Poona City. Wants a recipe for making fly papers.

In making fly-papers melt 1 oz. of powdered resin with 3 fl. dr. of colza oil in a small pot.. When thoroughly melted, stir well, and apply while hot with a small flat brush on thick sheets of paper.

Non-Inflammable Celluloid.

2572 B. S., Gujranwala. Wants a recipe for non-inflammable celluloid.

According to a French recipe non-inflammable celluloid may be prepared by dissolving ordinary celluloid in acetone in about the proportion of 1 gr of celluloid to 10 gr. of acetone, and dissolving pulverised magnesium chloride in alcohol in the proportion of 6 gr. of alcohol to 2 gr. of magnesium chloride and finally mixing the two solutions so as to obtain a pasty mass.

Bud-rot of Coconuts.

2037 U. N. B., Pithapuram. Asks how to cure bud-rot diseases in coconuts.

Bud-rot is a very troublesome disease from which coconut trees are apt to suffer in certain areas It has been observed that a certain green-skinned variety of coconut is less liable to this disease than the reddish and yellowish kinds. The first indication of trouble is the falling of the young fruit. Shortly after, the larger nuts drop and the leaves assume a yellowish colour. Soon all the large lower leaves droop and fall, leaving only the pale sickly tops which blow over at the first heavy wind. The best way of preventing the spread of the disease is cutting down and burning the diseased palms. It is not necessary to burn the entire trunk, but only the top, with a couple of feet of the upper end of the trunk.

The infection of bud-rot generally takes place at the bases of the leaves and spathes. If these parts of the palms were covered with a good fungicide and insecticide, infection could not take place A practice which accomplishes this end prevails to a certain extent in some places, and is said to have good results. A pound or two of coarse salt is wrapped in a piece of the fibrous portion of the leaf sheath and securely fastened to the youngest leaves. The rains dissolve the salt gradually and carry enough down to the leaf sheaths and act as a disinfectant Spraying with Bordeaux mixture and arsenate of lead would be a much surer way of accomplishing the same result : Woburn Bordeaux paste is also good The spraying of coconut trees is not at all an impossible thing to do, and is quite practical.

Gilding Solutions.

1061 V P. K., Coimbatore. Wants recipes for gilding solutions.

(1) Dissolve 1 part of dry chloride of gold in 160 parts of distilled water ; to this add gradually, solution of a carbonated alkali in distilled water, until the liquid becomes cloudy. This solution may be used immediately.

(2) Dissolve 4 oz of potassium cyanide and 1 oz of cyanide of gold in 1 gallon of distilled water, use the solu-

tion at a temperature of about 90° F. with a current of at least two cells.

Artificial Gold.

1829 G. B. S., Arcot. Artificial gold may be prepared by melting together 16 parts of copper, 7 parts of platinum and 1 part of zinc. If properly made this alloy will look like 16 carat gold. Articles made from it may be further electro-gilt.

Use of Potassium Bichromate.

2702 D. N L., Asansol. Asks the uses of Potassium Bichromate.

Potassium Bichromate is largely employed in the manufacture of chrome yellow, chrome orange, and all chrome pigments, it is used in woollen dyeing for the mordanting of woollen yarns, cloths, etc. ; for dyeing with alizarine and similar mordant dyes ; it is used as a bleaching agent for tallow, palm oil, and other fats in conjunction with sulphuric acid ; it is employed in tanning leather, and has many other uses.

Pigments from Potassium Bichromate.

2478 K. B. L. G, Ludhiana. Requires hints for preparing pigments from bichromate of potash.

(1) The pigment chrome-green is the oxide of the metal chromium which is usually made by fusing together bichromate of potash and boracic acid and subsequently washing the powder with water.

(2) The pigment chrome yellow is neutral lead chromate. It is formed as a very heavy precipitate of a fine deep yellow colour when a solution of potassium bichromate is added to a solution of a lead salt in water.

(3) Chrome brown may be made by dissolving 10 parts of potassium bichromate in 20 parts of water, heating to boiling, adding 13.5 parts of solid copper chloride and then gradually a boiling solution of 10 parts of soda in 20 parts of water, until effervescence no longer takes place. On cooling, chrome brown separates as a soft brown precipitate.

Composition of Chinese Blue.

2667 G. T. Karnik. Wants to know the composition of Chinese Blue.

Chinese blue is the well-known and favourite form of Prussian blue usually sold in fine powder or little cubes. Its composition is virtually identical with that of ordinary Prussian blue, but it is more free from impurities, and shows a fine bronze bloom or lustre on newly fractured surfaces. When pure, it is entirely dissolved by oxalic acid ; and its composition is about 52 per cent oxide of iron, 43½ cyanogen, and 4½ water. It is extensively employed in dyeing and calico-printing. Its tint varies from greenish to violet, according to modifications in the method of manufacture, the chief difference being that yellow prussiate gives a greenish tone and red prussiate a violet.

Axle-grease.

2819 N. T. C., Agra. Requires hints on the preparation of axle-grease.

Axle-greases fall under the technical classification of "set." greases. To a mixture of a mineral oil and slaked lime (the lime part) is added a certain quantity of rosin oil (the set part) and the whole having been well mixed, will in a short space of time set and become solid or semi-solid, according to the percentage of "set" used.

Axle-grease for wood is made as follows. Take 2 gallons of "medium" rosin oil, and stir in 5 lbs. of quick lime, slaked with 2 gallons of water. Then stand for 12 hours, or until the next day. Pour off any water that may separate. Then stir in 5 gallons of coal tar grease oil and 5 lbs. of powdered black lead. Generally it will be found sufficient to mix the materials cold, but a little heating will make a more homogenous grease.

Properties of Essential Oil.

3129 S. N. L., Basti. Wants to learn the properties of certain essential oils.

Bergamot oil is chiefly used in perfumery for the preparation of cosmetics, perfuming of soaps, and also in the preparation of liqueurs. Mixed with other volatile oils it increases their fragrance, and imparts, especially to spice oils, a delicacy like no other addition.

2. Geranium oil is used for many purposes. It serves in perfumery as a rose-like smelling substance, but is chiefly used for adulterating rose oil. It is employed as a substitute for rose oil, specially in the tobacco industry, e. g. in snuff.

3. Lavender oil by itself is only used for the finest perfumes and soaps. It is chiefly employed in preparing essences and lavender water.

4. Lemon Oil is largely used in the perfumery industry, e. g., in making Cologne water. But it should not be used for perfuming fats. Lemon oil is also occasionally employed in medicine.

5 Sandal wood oil is chiefly used in medicine, and also in perfumery.

6. Oil of Neroli is chiefly used for fine perfumeries.

7. Rosemary Oil is one of the principal ingredients of eau-de-cologne and the once famous Hungary water, and is also used in the manufacture of liqueurs, aromatic waters and for scenting soaps.

8. Cinnamon oil is used in perfumery, in the preparation of liqueurs, and for medicinal purposes.

9. Oil of Rose is chiefly used in perfumery. Medicinally it is not employed except, perhaps, for perfuming some pharmaceutical preparations. Rose water and rose essence also are frequently used.

10. Almond oil is used for perfumery purposes, in the manufacture of soap. It yields a very firm soap. It is also used in medicine, especially in the form of emulsions, in inflammations of the digestive and respiratory passages.

11. Thymol oil is primarily used medicine. It is also used in perfumery, for instance, mixed with other odoriferous substances, for perfuming soaps, and in the preparation of mouth waters.

Coir Making in Malabar.

2976 G. T. S., Conjeeveram. Wants to know how coir is made in Malabar.

The manufacture of coir yarn, rope and matting is an important industry in Malabar. The husks of the coconuts are burned in pits as near as possible to the water line of rivers, backwaters and creeks, and are left to soak for six months, a year or even eighteen months, the longer the better. The colour of the yarn, and thereby the quality, depends very much on the water in which the husks are steeped. It should be running water and, if possible, fresh. If the water be salt, the yarn may at first be almost white, but in a damp climate it soon becomes discoloured and blotchy. As soon as the husks are taken out of the pits, the fibre is beaten out with short sticks. It is dried in the sun for twelve hours and is then ready for sale. The fibre is next twisted into yarn and in that form the greater part of the coir made in Malabar is exported from Cochin to all parts of the world. Excellent ropes and mats are however made in Cochin.

Sugar from Coconut Toddy.

1875 D. V. R., Rajahmundry. Enquires how sugar is made from coconut toddy.

For the manufacture of raw sugar the sweet toddy of coconut collected in the evening is boiled as soon as it is brought in and then left till the morning toddy is collected. This is then added and the juice is boiled down till it becomes a saturated solution, when it is poured out into moulds. As the albumenoids in the juice coagulate at the surface it is apt to froth up. When this occurs a few drops of coconut oil or a little grated coconut is added and the froth subsides. The raw sugar is usually of a dark colour on account of the excess of lime present in the juice from the liming of the pots.

Considerable improvement is however possible in the making of raw sugar. The filtering of the juice through sand filters renders the juice much cleaner, and the addition of small quantities of alum to the juice precipitates the lime and magnesia, which renders the raw sugar much less deliquescent, so that it is not only of a much better colour but will keep hard for a reasonable length of time. Very fair crystallized sugar can be prepared by centrifuging the raw sugar.

The juice of the coconut palm compared very favourably with that of the sugar-cane, not only in the amount of sucrose present but in the purity of the juice.

Floating Soaps.

2283 P. K. R., Ludhiana. Desires to know a good recipe for floating soaps.

These are soaps that swim in water by reason of the air enclosed in them. They are therefore preferred for bathing purposes. The process of preparation is described below.

Saponify 135 kilos of tallow and 15 kilos of palm oil in the ordinary way in a large soap kettle with $\frac{3}{4}$ soda and $\frac{1}{4}$ potash lye of 9° to 12°B., until a clear dark paste is obtained with a slightly alkaline touch. In order to make the stock soap of a good quality, boil the soap, (after it is fitted) for two hours more on a gentle fire. After all the fat is saponified salt out the soap. 7 to 8 per cent of salt will suffice for the purpose. Increase the fire ; add more salt solution of 3° to 4° B., continue boiling until the soap froths up well for 1 hour. The mass now boils quite light and flaky. Then withdraw the fire and allow to stand quietly for a quarter of an hour. The sub-lye will separate out and the soap can then be framed. Scoop out the soap from the top of the kettle only and fill two frames halfway. Cover them up to retard solidifying. Now work up the remainder of the soap in the kettle to a froth by means of paddles. Divide the mass into 2 portions and pour into the frames. Crutch the contents of the frames into the curd, until the whole becomes uniform. Repeat this operation for 2 or 3 times until the mass becomes quite porous and flaky. Cover up the soap with a lid fitting into the frame. So that it lies directly on the soap and exert uniform heavy pressure. Cut up the soap into blocks and bars after two days.

Blueing Gun-barrel.

1162 J. D. R., Calcutta. Wishes to be enlightened on blueing gun-barrels.

A durable blue on gun-barrel may be obtained by dipping the same in a half per cent. solution of red prussiate of potash mixed with an equal volume of a half per cent ferric chloride solution.

Lacquering Brass.

2808 S. L. S., Agra Cantt. Writes, "please describe the process of lacquering polished brass ware."

Lacquering brass wares denotes the covering of finished brass work with transparent varnish to preserve the surface and finish of the articles from atmospheric changes. For this purpose a heating chamber is to be specially constructed. A floor of iron plates is heated by running a series of flues underneath. The heat is diffused on the upper surface where the articles to be lacquered are laid. The lacquer or varnish is composed of spirits of wine in which has been dissolved seed lac. If desired, turmeric, dragon's blood or sandal wood, will impart various shades of colour when dissolved in the above. The brass articles having been coated over when cold with the lacquer, are laid on the hot iron plate and when sufficiently heated are again coated with lacquer applied with round camel hair brushes. The coating must be applied delicately and uniformly. Perfection can be gained only through skill and care. It should be borne in mind that unless the brass wares, are previously finished the lacquer being transparent will show up existing defects.

To Make Blue Colour.

3116 S. J. G., Howrah. Wants to make blue colour.

Mix 2 parts of alum with 1 of sulphate of iron, and add sufficient water to dissolve them. Then prepare a solution of yellow prussiate of potassium, add a little sulphuric acid, and pour the mixture drop by drop into the first solution until a precipitate is formed, which is washed upon a filter and then dried. The product will be what is known as "Berlin blue".

Emulsion of Cod-liver Oil.

2853 K. N. S., Arimalam. Wants a recipe of emulsion of cod-liver oil.

Cod-liver oil, 8 oz ; yolks of 2 eggs ; tragacanth powder, 16 grs ; elixir of saccharin, 1 dr ; simple tincture of benzoin 1 dr ; spirit of chloroform, 4 dr essential oil of almonds, 8 minims ; distilled water to produce 16 oz. Measure 5 fl. oz. of the distilled water, place the tragacanth in powder in a dry mortar, and triturate with a little of the cod-liver oil ; then add the yolks of the eggs ; stir briskly, add water as the mixture thickens. When of a suitable consistence add the remainder of the oil and water with constant stirring. Transfer to a pint bottle, and the elixir, tincture, spirit, and essential oil ; shake well, and add water to make the product measure 16 oz.

Perspiring Hands.

2919 P. A. M., Cannanore. Asks how to prevent hands from perspiring.

Rub the hands several times per day with a mixture of 8 parts of glycerine, 10 of borax and 125 of rose water by weight.

Cement for Alabaster.

2913 B. C., Agra. Wants to know the composition of cement for alabaster.

(a) Take finely powdered plaster-of-paris and make into a cream with water. It may be used to join and fit together pieces of alabaster or marble. (b) Melt together equal parts of yellow resin and beeswax: then stir in half as much finely powdered plaster of paris. This cement will stand unaffected by heat.

Shaving Cream.

2777 N. C. B., Calcutta. Wants a recipe of good shaving cream.

Here is a good recipe for preparing shaving cream.

Curd soap	1 lb.
Almond oil	4 oz.
Glycerine	2 oz.
Spermaceti	1 oz.
Potassium Carbonate	½ oz.
Water	32 fl. oz.

Cut the soap into fine chips and dissolve it in three-fourths of the water (on a water bath). Dissolve the spermacetti in the oil. While warm mix it with glycerine, potash and remainder of the water. Transfer to a warm mortar, gradually and steadily incorporate the warm soap solution, and continue to stir until a smooth paste is formed. Add perfume to taste.

Wheat Starch.

2253 P. C. B., Tanjore. Wishes to be enlightened on the preparation of wheat starch.

Wheaten flour is worked for starch by the following process.

The flour is mixed with a small amount of water to a stiff dough, placed in special kneading machines, and the excess of water kneaded out. Most of the starch goes into suspension in the water forming a milk, while the sticky gluten and cellulose fibres remain behind as a thick soft mass. The starch milk is emptied out of the trough from time to time, the last traces being removed from the remaining gluten by passing the mass through rollers. The starch milk is separated into pure starch and gluten starch by centrifuging in special drums which are non-perforated. The layer of starch is cut out from the sides, pressed in iron forms until the water content is diminished considerably and then slowly dried in drying chambers. The residual cake is finally packed in paper boxes and dried until peculiar longitudinal fissures or cracks appear.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of INDUSTRY are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

982 A. S., Rangoon. Take ginger (in very fine powder), 1 oz. ; powdered sugar, 2 lbs ; syrup, q. s. to make a paste.

1329 M. R. M., Doraha. An article on coaltar will appear soon.

1473 K. L. D., Bombay. Your query is engaging our attention.

1930 B. H. K., Bombay. Formula of the article referred to by you is not known to us.

1973 C. F., Colombo. No. you cannot use washing soda in place of sal soda. Sal soda is sodium carbonate. It is usually obtained from chloride of sodium by the action of heat, sulphuric acid and carbonaceous matter.

2053 N. G., Bombay. Process of manufacturing coir appeared in November 1922 issue. For yarn please go through the last December issue.

2088 S. A. B., Sargodha. Refine the pipeclay before use.

2101 S. D., Lahore. You may go through Bengal Sweets to be had of Chackraverty Chatterjee & Co. Ltd., 15, College Sq. ; Calcutta. Thacker's Indian Directory may serve your purpose.

2209 P. S. S., Tundivanam. After refining the castor oil bottle it. There is no special process.

2294 S. A., Amritsar. Formula of artificial camphor appeared in July 1923 issue. All other enquiries are engaging our attention.

2305 J. N. S, Nimasarai. Process of preparing *paparh* will appear in an early issue.

2356 V. B. R., Masulipatam. Orthonitrophenvl propionic acid is used in making synthetic indigo.

2362 N. J. D., Kathiawar. Put some *amla* in any suitable oil for some time then decant the oil and use it.

2383 A. T. N., Bangalore. Can supply kora silk. China crackers may be had of Orient Fire Works Co, 85-1, Upper Circular Road, Calcutta. Other formulas you require will appear in early issues of INDUSTRY.

2549 G. V. R., Masulipatam. Process of preparing gem biscuits will appear in an early issue.

2572 B. S., Gujranwala. Celluloid bangles cannot be made incombustible but celluloid when manufactured may be made incombustible when treated specially for the purpose. The process appears elsewhere in this issue.

2582 K. B., Amritsar. Formula of potato celluloid appeared in July 1922 issue. Recipe of copying ink . will be found in September 1921 issue.

2585 K. S., Kyankse. For cream separator apply to P. Lodge & Co., Post Box 6772. Calcutta and Jupiter Trading Agency, Mulji Jetha Market, Karachi. An article on preparing condensed milk appeared in November 1920 issue. Process of preserving butter appeared in February 1923 issue.

2586 A. B., Boath. Lithographic stone occurs in natural state. Litho stones may be supplied by The Litho Stone Mfg. Co., 1103, Kalasi Palyam, Bangalere City ; Prabhakar & Co., Bazar Square, Sagar, Shimoga and The Finest Quality Litho Stone Co., 36, Great Wilson Street, Leeds, England.

2587 S. K. A., Karachi. For picture printing you may write to Alphalsa Publishing Co., 2 & 3, Scrutton Street, London E. C. 2 ; Regent Publishing Co. Ltd., 318, Ensle Road, London N. W. 1 ; Photochemic G. m. b. H. N. Stolpischestrasse 37, Berlin, Germany ; Noritas Verlag, 6, Kellner, Ritterstrasse 77-78, Berlin S. W.

Germany ; Bengal Art Studio & Printing Ltd., 21, Holwell Lane, Calcutta and Bolton Fine Art Litho Press, Tamarind Lane, Bombay. Colours may be supplied by Messrs Aminchand Mehra & Sons. 34, Armenian Street ; Mohamad Alibhoy & Sons, 44, Armenian Street, and Hansraj Visbram, 13, David Joseph Lane, all of Calcutta.

2588 S. B. S., Bijapur. For soda water machines write to Little & Co., 3, Grants Lane, Calcutta and Vitaldas Karsandas, 364, Upper Duncan Road, Two Tanks, Bombay No. 8.

2589 J. N. B., Ludhiana. Process of deodorising coconut oil appeared in April 1922 issue.

2590 D. R., Pilibhit Photographic materials may be supplied by R. Kanishi, 2, 3, 4, 17 and 18 Nichome, Honcho, Nihon-bashi-ku, Tokyo, Japan.

2591 A. H. P. R. S. C., Madras. Can supply Madras *lungis*.

2592 R. C., Dera Ghazi Khan. The following is the list of journals dealing with machineries ; (1) The British Engineers' Home and Export Journal, 93-4, Chancery Lane, London W. C. 2 ; (2) Calverts Mechanics Almanac published by John Heywood Ltd, Deansgate, Manchester, England ; (3) Canadian Foundryman. The Maclean Co., of Great Britain Ltd, Montreal, Canada and (4) Canadian Machinery published by The MacLean Publishing Co. Ltd., Montreal, Canada. In awarding prize use your own discretion.

2594 U. P. B. F., Cawnpore. To sell bristles apply to H. Bevis & Co., Cawnpore ; Brushwares Ltd, 123·1, Halsey Road, Cawnpore and Bonner & Co, 209, Cornwallis Street, Calcutta.

2595 S. N. A., Gaibandha. Your query is outside the scope of INDUSTRY.

2596 T. L. N., Ongole. Formula of good fountain pen ink appeared in August 1922 issue.

2597 A. K., Kallai. Knitting machines may be had of Indo-Swiss Trading Co., 27, Pollock Street, Calcutta. You will have to invest Rs. 2500 for starting a hosiery mill. Ice plants may be supplied by Alex Brault, 7-A, Wellesley Place, Calcutta. It will also require not less than Rs. 10,000 to start with. For starting canning industry you will have to invest more than Rs. 25,000. For starting essence and essential oil extracting industry and lac industry you will have to lay out Rs. 20,000 and Rs. 50,000 respectively.

2598 M. S. P., Masulipatam. Addresses of picture post card dealers of France appeared several times in these columns. Books may be supplied by Mc.Caskly Register Co. Alliance, Ohio, U S A ; McMillan Book Co., Syracuse, New York, U S A ; A. H. Wheeler & Co., Temple Chambers, Temple Avenue London E.C. and Anglo-Eastern Publishing Co., Ltd., 48 and 50, Waterloo Road, London E. 1.

2600 V. B., Kheti-Lakhimpore. Woollen yarn may be supplied by E. B. Bros & Co., 11, Dharamtala Street, Calcutta.

2601 P. S. R. A., Salem. Your query is not in our line. You refer it to Alex Brault, 7A, Wellesley Place, Calcutta.

2602 V. R. N., Coimbatore. For white acid write to B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. imitation diamonds may be supplied by G. B. Raman & Co, 69, Narayan Mudaly St., Madras.

2603 M. C., Tirutraipundi. Clocks may be supplied by Alfred Tritze, Hamburg 36, Germany ; Victoria Clock Co., A Maier St., Georgen, Schwarzwald, Germany ; K. Hattori & Co, Ltd, Ginza Shichome, Tokyo, Japan ; Sakaguchi & Co, 1, Chome, Motomacho, Kobe, Japan and Jura Watch Co, Delemont, Switzerland.

2604 M. K. Z. H, Kyankpyw. Addresses of sugar refineries appeared in October 1923 issue of COMMERCIAL INDIA, the sister journal of INDUSTRY.

2605 J. C., Tanjore. Refer your first query to the soda machine manufacturers. Ornamental lace made by hand was formerly called bone lace or pillow lace but of late years being produced by machinery it is called bobbin net. All other terms you have mentioned refer to particular trade marks.

2607 P. R., Sandhanwala. Chloride of lime and calcium chloride is one and the same thing. There must be something wrong with your process of manufacturing.

2608 M H. M., Bassein. To make your face powder coloured add colour of required tint. Formula of varnish appeared in November 1923 issue. German dyes may be supplied by Aminchand Mehra & Sons, 34 Armenian Street, Calcutta. Addresses of foreign trade journal will be found in September 1024 issue under No. 1710.

2612 C. L T, Pilibhit. You may go through Boy's Pictorial published by Odhams Press Ltd, 84-98 Long Av, London W. C. 2; Daily Mail published by the Associated News-papers Ltd, Carmelite House, London E. C4. and Strand Magazine published by George Newnes Ltd., 8-11 Southampton Street, Strand, London W. C. 2. You may also consult Scientific American, New York, U. S. A. For Bengali books write to Messrs Gurudas Chatterjee & Sons, 201 Cornwallis Street, Calcutta. You may buy the back volumes of INDUSTRY and utilise the formulas published therein. The following are the addresses wanted by you: Railways and Engineering published from 3-1 Council House Street, Calcutta, Indian Railway Gazette published from 11 Kyd Street, Calcutta and Indian Telegraphist, Allahabad British Indian Arts & Crafts has ceased publication. For the required lamp write to K. C, Dey & Sons., 96, Lower Chitpur Road, Calcutta. Formulas of invisible ink will be found in September 1921 issue of INDUSTRY. Formulas of blue-black and red inks appeared several times. You may however consult November 1922 issue. Please go through advertisement pages of INDUSTRY.

2613 G. R K., Masulipatam. An article on dry cell construction appeared in March 1924 issue. For books on the subject you may write to Messrs Chakravertty Chatterjee & Co. Ltd., 15 College Square and Thacker Spink & Co, 3 Esplanade East; both of Calcutta.

2614 V, K. R., Bezwada Can supply turmeric in very large quantities. Optical goods may be supplied by General Optical Co, Inc, Mt. Vernon, New York and Wollensak Optical Co., Rochester, New York; both of U. S. A. Fire-works may be supplied by Goldstein & Co., Edgard, C2, Klosterstrasse 6, Berlin and L. Bock, Linienstrasse 81, Berlin; both of Germany.

2615 S E. M., Sattur. For technical and industrial books write to Book Ro, 4/4A College Square, Calcutta.

2618 T. D. F., Rawalpindi. For formula of amla hair oil see elsewhere in these columns.

2619 S C D., Calcutta. Put brass in some crucible and apply heat.

2620 D. D., Aligarh. Katha and betal nuts may be bought of Bansi Dhar Dutt, 126 Khengraputty, Barabazar, Calcutta. Thacker's Indian Directory may serve your purpose.

2622 G. N. T., Madras. For technical books write to Book Co. Ltd., 4-4A College Square, Calcutta.

2623 S S. J, Sattur. You may write to Consul-General for Germany, 2 Store Road, Ballygunge, Calcutta; His Majesty's Trade Commissioner, 11 Clive Street, Calcutta and Trade Commissioner for America, Grosvenor House, 21 Old Court House Street, Calcutta who will supply the required addresses.

2624 M. J. R. I., Kulpatti. No further particular of cotton is known.

2626 L. S, Quetta. An article on boot polish manufacture appeared in June 1923 issue.

2628 R. K. S., Peshawar City. Wants to be put in touch with English, German and American importers of fur skin and assafoetida.

2629 B. B. L., Ambala City. Some of the formulas you have referred to already appeared in our previous issues. Some appear in this issue and others will appear in an early issue. One shilling is equal to about 10 as. Now Rs. 281 is almost equal to 100 dollars of America and Rs. 88-8 as is equal to about 100 yens of Japan You may calculate the respective values according to the above figures. In Germany transactions are now made in shillings and not in marks.

2630 I. M. W., Cocanada. Reply to your queries appeared in last November issue.

2631 N. R, Naban. Cut piece-goods may be supplied by S. Chothia & Co, 375 Hornby Road, Bombay: Hotchand Tarachand & Co., Bunder Road, Karachi and Badri Dass & Sons, Chandni Chowk, Delhi. Wants to be put in touch with importers of old coat.

2633 R. P., Calcutta. Process of preparing flycatching paper appears elsewhere in this issue. Your other query is outside our scope.

2634 V. K. R, Perintalmanna. For imitation leather please try Sircar Bros, 66, Russa Road North and W. S. Dossen & Co., Post Box 7864; both of Calcutta.

2635 A F S, Bombay. For an article on cotton industry of India please go through the last issue.

2636 D R. P., Indore. All the addresses required by you will be found in Thacker's Indian Directory.

2637 L. J F. C, Dabwali. Akbari Burma, Rangoon and Rangoon Advertise, Rangoon will serve your purpose.

2638 Z. M. C., Daltonganj. To sell katha and charcoal advertise widely, we cannot undertake it.

2639 A. H. K., Amangabad. Shoes having rubber soles are manufactured in India hence it will not be profitable for you to import them from abroad. Glass tumblers are manufactured by Jubbulpore Glass Works. Matches are manufactured by Lucifer Match Works, 23J, Paikpara Raja Manindra Road, Belgatchia, Calcutta and Amrit Match Factory, Bilaspur, Kota.

2641 B. S. R., Bissamcottah. For starting small industries please go through September 1923 issue of INDUSTRY. Formula published in April issue of INDUSTRY is correct; you should not alter it. First try to proceed according to the direction given in the formula and let us know your difficulty when we shall try to solve it.

2645 G. P. V., Bhagalpur. You may consign your goods to big rice merchants of England such as, D. M. Horne & Co, 3, New London Street E. C. 3 and Carbutt & Co. Ltd., 1, Dunster Crt. Mincing la E C. 3; both of London Tin boxes may be had of Gajanand Rampertap & Co., 6, Halsibagan Road, Calcutta. For other queries please refer to the last April issue of INDUSTRY.

2648 S. D. V., Boroda. No machine is required for manufacturing indigo. Wants to be an apprentice in a glass factory. Without practical knowledge you would not be able to manufacture glass.

2649 S. M. C., Ahmedabad. Your query is engaging our attention.

2650 S. M. A. S., Nagina. For medical directory apply to Messrs B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta.

2652 K. K. C, Itarsi. The properties of soap stone appeared in the issue of December 1921. Wishes to be put in touch with buyers and and sellers of soap stone.

2653 D. D., Sialkot. Ideas for small capitalists appear regularly in the columns of INDUSTRY, which you may please consult.

2654 M C, Tirutraipundi. Spectacles, pebbles, etc. may be had of Messrs B K. Paul & Co., Bonfield's Lane, Calcutta.

Apply to the chief Agent and consulting Match expert.

A P. GHOSE

M S.C I. (Lon

42, Beniapukur Road, Calcutta.

2655 R. S. I., Kottar. Printing inks are manufactured by: Inks Manufacturing Co Ltd, 21, Aminabad Park, Lucknow: John Dickinson & Co., Mercantile Bldg., Calcutta; Richardson Printing Ink Manufacturing Co, 427, Grand Trunk Road, Howrah. Rubber may be had of P. S. Michael, 76, Princep Street, Calcutta. For block and half-tone works write to U. Roy & Sons, Garpar Road, Calcutta; Bharatbarsha Halftone Works, Bharatbarsha Office, 20 Cornwallis Street, Calcutta. Types are cast by Universal Type Casting Co, Madras; Indian Type Foundry, 57, Harrison Road, Calcutta. Loadstone is ordinary magnet. A test of foreign machinery manufacturers will be found in the September, 1923 issue of INDUSTRY.

2656 M. A. M., Ellore. You can start soap manufacturing business with 400 to 500 rupees. Recipes of soap making appeared in the October, 1923 issue of INDUSTRY.

2658 M. B. T., Tinganepalle. In vaccum pans there are arrangements for pumping out air from the pan and thereby creating vacuum within.

2660 K. V. & Sons, Rajahmundry. List of trade reviews has already appeared in the Query columns. Recipe for toilet snows and lime juice glycerine will be found in August, 1921 issue. Also consult July 1924 issue of INDUSTRY.

2661 N. R. G., Chhaganlal. Please explain your query clearly.

Soap & Perfume Manufacturers.

samples of perfumes for above trade will be sent on recipt of the inquiries from bonafide manufacturers. Excellent qualities of the highest strength. Prices lowest. Write for Samples today—

Anglo-Indian Drugs & Chemical Co.,
No. 155, Juma Musjid Circle.
P. O. Box No. 2082.
BOMBAY.

2662 M L A., Ambala. Answer to your query appeared under No. 1111 in the Query column of INDUSTRY but it is regretted that Ambala was misprinted as Imphala The method of preparation of patent inks is not known. Water soluble aniline dye of the particular colour you want may be had of Amin Chand Mehra, 34, Armenian Street, Calcutta. Try recipes with sandal oil.

2664 A. M, Hampankatta. The process for removing the rancid odour of coconut oil will be found in May, 1924 issue of INDUSTRY. You are referred to some work on laundry to be had of Chakraverty Chatterjee & Co. 15, College Square, Calcutta.

2666 K P. G., Matunga Recipes for hair dyes appear elsewhere in this issue. Ideas for small capitalists appear regularly in INDUSTRY, which you may please consult. To resharpen blades try Simpson & Ferris, P. O. Box 9079, Calcutta. To remove stains from cloth, place the stained part flat in a plate or dish and sprinkle crystals of oxalic acid upon it adding a little water. To remove stains due to lubricants, which contain besides grease, oxide of iron worn off the machinery first the grease must be extracted by means of benzine, ammonia, etc. and then the spot is treated with oxalic acid or chloride of lime water or even lemon juice. Rinsing must follow the application of these agents.

2668 S. K. R, Nowgong. Works regarding dairy and poultry business may be had Kamala Book Depot, 15, College Square, Calcutta.

2669 C, Brahmanbaria. Colours you mention is available of Messrs K. H. Kabbur & Co, 14, Clive Street, Calcutta.

2670 P. W. N., Bombay. There is no company manufacturing alarm clocks in India. Please state what Indian machinery you require when the address will be supplied to you.

2672 J. N. S., Maldah. To prepare biris you are referred to an article on the subject appearing in June, 1922 issue of INDUSTRY.

2673 R. P., Samastipur. For Ink Industry write to the Editor, Business World Office, Datta Villa, Belgachia.

2674 T. R. B., Damoh. Signalling is taught at The George Phonetic and Telegraph Training School, 97-A, Upper Circular Road, Calcutta.

2676 P. V. N. & Sons., Pulavadi. Cotton threads may be had of E. B. Bros. & Co , 11, Dhurrumtollah Street, Calcutta.

2677 S. B. D. G., Chittagong. Wants to buy all fittings of suit cases such as nickel and brass clutches, buttons ,nails, boards, etc.

2678 G. S. & Sons, Cuttack. Yarns are supplied by East and West Trading Co., 16, Bonfield's Lane, Calcutta.

2679 S. D , Sind. Preparation of snuff appeared in last November issue. Machine for making boot laces and tapes are available of The Oriental Machinery Supply Agency, 20-1 Lal Bazar Street, Calcutta.

2680 K. R. I , Bagepalli. Technical subjects are taught by correspondence by International Correspondence Schools, Box 3925, Scanton, Pa, U.S A. For particulars regarding institutions you name communicate direct with them.

2682 R. K. & Co , Salem Your query is outside our scope.

2683 R. C. & Bros., Akola. Wants to be put in touch with dealers in bristles and coconut leaves of which brooms are made.

2687 G. & Co , Wazirabad. There is no process known to remove the bad smell of barium sulphide. Wishes to be introduced to firms in Dijoubti dealing in cutlery.

SETT DEY & CO

ORIGINAL HOMEO PHARMACISTS
42, Strand Road, Calcutta.
Dealers in Original Homoeopathic dilutions and Biochemic Triturations.
Catalogue Free on Application.

2688 L. H. S., Sholapur. It is not possible to discuss in detail all the formulas we desire to know. You would get them in the last two or three volumes of INDUSTRY, which you may consult. Perfumery materials are supplied by D. G. Gore, Sayana Building, Lohar Chawl, Bombay, No. 2 : See 2687. Wants to buy artificial wax and groundnut.

2689 J. S., Allahabad. German textiles are supplied by Koper Docke & Co., P. O. B. 114, Bremen 7, Germany. For, information regarding German market write to Import and Export Review, Berlin S. W. 19, Krausenstrasse 38-39.

2691 M. I , Agra. Silk and mercerised yarns are supplied by East and West Trading Co , 16 Bonfield's Lane, Calcutta.

2693 C. L. K. & Sons, Moradabad. For particulars of Moradabad art consult Indian Art at Delhi by Sir G. Watt.

2694 A. C. G., Namrup. Potato may be bought of Golak Chandra Sirkar 20, Shambazar Bridge Road, Calcutta.

2695 G. G. R., Masulipatam. Formaldehyde used in large quantities as a disinfectant and is used extensively in many industries such as leather making, India rubber goods, photography. Starch making appears in this issue. The best and cheapest dyes are manufactured in Germany.

2696 H. P. K. R., Bangalore. The following are the addresses of foreign and Indian jewellers : Rudolf Rink, Oberstein, Rhineland, Germany : Hagenmeyer & Kirchner, Berlin C. 19 ; Aug Sohni, Oberstein-Nahe, Wilhelmstrasse, Germany ; Ghosh & Sons, 16-1, Radha Bazar Street, Calcutta. Rubber stamp outfits are supplied by E. M. Richford, 8 and 9 Snow Hill, London.

2697 A. P , Tuni. Tin boxes are manufactured by Ram Pershad Gajanand, 6, Halsi Bagan Lane, Calcutta.

2698 L G. D., Dharwar. Machineries for paints, etc, may be had of Blair Campbell & Mc. Lean Ltd., Woodville Street, Govan, Glasgow. Gypsum may be made into fine plaster, the gypsum is broken into small pieces, calcined in an oven, ground between stones and sifted to a fine powder, which is next mixed with suitable amount of water.

2699 R. N. M., Darbhanga. For yarn write to East and West Trading Co., Bonfield's Lane, Calcutta.

2700 J. P., Belangunj. The export of peacock's feather is prohibited by law.

2702 D. N. L., Asansol. A formula of preparing colour from bichromate of potash appears elsewhere in this issue.

2705 V. D. R.. Tanuku. Clocks and watches are imported by Abrecht & Co, 17 & 18, Radha Bazar Street : Esoofally Hiptalla & Co, 10, Radha Bazar Street and Anglo-Swiss Watch Co,, 6 & 7, Dalhousie Square ; all of Calcutta. Glass bottles may be had of Satya Charan Paul & Sons, 194, Old China Bazar Street and S. K. De, 124, Sova Bazar Street ; both of Calcutta.

2706 P. K. C., Calcutta. First secure pure castor oil, then refine it and use. For full detail please consult last September issue.

2707 L. H. S., Malsiras. Formula of snow cream will be found in July 1923 issue A good recipe of hair lotion appeared in September 1924 issue. Many formulas of hair dyes appear elsewhere in this issue. All other formulas referred to by you appeared in the last volume of Industry.

2710 D. K, Indupur. You may use grinding machines which may be bought of S. L. Dutt & Co, 78, Manicktola Street, Calcutta.

2712 M. A., D., Baroda. For photography you may write to the School of Photography, Poona. You may go through books on practical journalism which may be supplied by Messrs Thacker Spink & Co., 3 Esplanade, East, Calcutta. For label printing write to The Imperial Litho and Tin Printing Works, 1-2, Machua Bazar Street, Calcutta. For glass bottles refer to No. 2275, above.

2713 K. S. B., Karauli. The very name ice cream suggests the use of ice in its preparation. Fruits cannot be preserved in the way mentioned by you. Yes, Indian Academy is still in existence.

2714 K. N. B C, Rewari. Articles mentioned by you are all fruits and vegetables available at particular season of the year. For example plum of topa variety is obtained in winter while jack fruit and musk-melon is obtained in the summer. For further particular consult an anglo-vernacular dictionary. No modification should be made in our formulas.

2715 S. C., Nadiad. Shellac may be bought of M. M. Ispahani & Sons., 51, Ezra Street and Bengal Shallac Factory Ltd, 55-58, Ezra Street ; both of Calcutta. Roots of yellow docks may be had S. N. De, M.Sc, Post Box 7851, Calcutta.

2717 R. P. G, Umaria. Beleric myrobalans are employed in India as an inferior dyeing and tanning material. If taken in excess they are said to produce intoxication. They are also used as cattle food when fresh. The seed yields a fatty oil which is used medicinally.

2718 V. A. B., Srinagar. Formula of blue-black will be found in August 1924 issue.

2720 M. L S, Tista. For flour grinding machines write to Messrs Burn & Co, 7, Hastings St, Calcutta.

Bombay Deshi Oushadhalaya.
Factory & Dispensary.
ASK FOR ANY FEVER
AGUE KILLER.
1 Phial as. 8. Doz. Rs. 5.
and our other popular remedies. Can be had everywhere at Cheapest Rate.
PEARL & CO., Victoria Garden,
BOMBAY.

2721 S. C., Gwalior. We cannot venture opinion about advertisement.

2722 P. K. R., Suri. All the formulas referred to by you will be found in the last two or three volumes of INDUSTRY.

2723 A. K. M., Vizagapatam. The required dye may be had of Aminchand Mehra & Sons, 34, Armenian Street, Calcutta.

2724 P C., Raigarh. Formulas of hair dyes appear elsewhere in this issue.

2725 N. L. R. B., Shillong. Boot polishes may be had of Chandra & Co., Bentinck Street, Calcutta Carbide may be supplied by K. C. Dey & Sons; 96, Lower Chitpur Road, Calcutta. Olive oil may be had of B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta.

2728 M. L. M., Cawnpore. For tobacco preparation for chewing purpose please go through November 1924 issue.

2729 H. N., Cawnpore. Match splints, veneers, etc. may be had of Bhawani Engineering & Trading Co., 122-1, Upper Circular Road and Bengal Small Industries, Co. 91, Durga Charan Mittra Street : both of Calcutta.

2733 P. N., Chokkadi. If you go through December 1924 issue you will be able to make an idea of the warping machine.

2734 T. I. M , Cuttack. Formula of washing soap will be found in October 1923 issue. Foreign addresses will be found in these columns

2735 R N P., Saharanpur. You may extract til oil with the help of oil extracting machine.

2736 B S. B , Tinnevelly. All-India Exhibition has been closed.

2737 P K. D , Tellicherry. All those are chemical terms For clear significance of the terms go through a manual on chemistry.

2739 D. P J , Morar. An article on veseline preparation appeared in December 1921 issue. You may add any suitable perfume of Heiko brand You may refer your query to Oriental Printers and Publishers Ltd., 32, College Street, Calcutta.

2740 P. V. R., Nagercoil. Garnet is a precious stone, of which there are different kinds. Principal localities are Pegu, Ceylon and Greenland But common garnet is opaque or only translucent ; colour, reddish, yellowish, greenish or blackish brown. To sell precious stones advertise through the pages of INDUSTRY. You may write direct to the party concerns and give your suggestions.

2741 A. L S , Dacca. For colour printing write to E. S Wigg & Son Ltd. 669, Hay Street, Perth, Western Australia and Nister & Co., Nurenburg, Bavaria, Germany. Collapsible tubes may be supplied by Venesta Ltd., 1, Great Tower Street, London E C. 3. Can supply lajanti seeds.

2743 K. L B , Bombay. You may consult Thacker's Indian Directory to be had of Mesers Thacker Spink & Co , 3, Esplanade East, Calcutta

2745 L. S , Myitkyina. For books on candle making write to Messrs Chakravertty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

2446 J N S , Chapra You may refer your query to Consul-General for Japan, 7, Loudon Street, Calcutta.

2748 K. B. L. G , Ludhiana For technical books enquire of Messrs Thacker Spink & Co , 3, Esplanade, East, Calcutta.

2752 K C. D. G , Mymensingh. We do not think any one will try to utilise crushed sugar cane wastes. However you may try the paper mills.

FIRST AND GOLDEN REMEDY
For various Bodily Ailments
Arvind-Nilgiri Eucalyptus Oil.
(Guaranteed Absolutely Pure Eucalyptus Oil)
We have manufactured this Arvind Eucalyptus Oil in our own Factory at Coonoor—the Nilgiri Hills under expert supervision
Used for Plague. Cholera. Malaria, Influenza. Rheumatism, Cuts Sprains. Burns Scorpion Bites etc. etc 1 lb bottle Re 1-12, 1 oz bottle As. 4 Discount on Big orders. Postage & packing extra.
LOKMANYA AGENCY, Bombay Branch,
Bombay 4.

2753 M. V P. C, Poolavadi. Wants silk pate labels for coating and shirting for all colours.

2754 C. C. S, Kathiawar. An article on the preparation of soda from reh deposits will appear in an early issue.

2755 N.' G. B., Sevalia. Sugar crystals may be ground to fine powder with the help of handy machines. Try S. L. Dutt & Co., 78, Manicktola St., Calcutta.

2656 F. D. D. J, Bombay. Coconut oil may be used in the manufacture of shaving soap. Formulas 'for' the articles have appeared from time to time.

2758 B. P. P, Bombay. Bengal is noted for malaria as Assam is known for Kalazar. For detailed information you may consult with advantage the Administration Reports of the different provinces. For maps write to the School Book Supply Depot, Bowbazar, Calcutta.

2760 D. Bahawalpur State. For rope making machine, etc. you are referred to The Oriental Machinery Supply Agency, 20-2, Lal Bazar, Calcutta.

2762 K. C. S, Aligarh. Addresses of English bottle merchants are :—(1) British Glass Industries Ltd, Stephenson St., Canning Town. E. 16. (2) Bagley & Co. Ltd, King's Cross N. 1. (3) Breffit Edgar & Co. Ltd., King's Cross N. 1. All of London.

CHEAPEST HOUSE FOR
Sporting Goods
Silver Medals, Cups & Shields.
Fine Silver Medals in Velvet lined cases.
Rs 3-12 Each.
Largest Stock & Variety
Illustrated Lists Free.
Carr & Mahalanobis,
Chowringhee Corner, CALCUTTA.

2763 B. S. G, Rajshahi. (1) One minute cameras may be had of E. M. Solomon & Co, 3, Kenderdine Lane, Calcutta. (2) The Commercial Library 1, Council House Street, Calcutta lends out books. (3) In advertising in foreign countries you may approach through advertising agent in India.

2766 K. P. S., Mewar. Wants to take up agency of clothes and novelties.

2767 R. V., Pondicherry. Perfumery materials may be had of D. G. Gore, Sayana Bldgs, Lohar Chawl, Bombay.

2768 K. M. U., Recipe for making Surma will appear soon.

2769 R. D, Aden. Piece-goods importers of Calcutta are (1) Radha Kristo Dutta & Sons, 125, Old China Bazar Street, (2) Arun Bhusan Basak, Khengraputty (3) Hazarimull Sardarmull, 78, Clive Street, all of Calcutta.

2770 M. R. T, Jullunder. You may enquire of (1) Oxford Correspondence College Ltd, H. Giles; Oxford, England (2) School of Commerce, Accounts and Finance of the New York University. (3) The International Correspondence Schools Ltd, London. Elphinstone Bldg. Mirzban Road, Fort, Bombay.

2772 C. M. B., Travancore. Spectacles and parts may be had wholesale from Lawrence and Mayo, Old Court House Street, Stephens & Co., Bow Bazar Street; both of Calcutta. You may retail the articles at a profit.

2771 A M., Calcutta. Full particulars regarding fish canning industry will be available from The Director of Industries, Madras.

2777 N. C. B, Calcutta Formula for shaving cream appears elsewhere.

2778 L. J. S, Hyderabad. Crystal soda may be had of Calcutta Crystal Works, 67, Durga Ch. Mitter Street, Calcutta.

2779 S, G, Nagpur. Bentley's Code may be had of Messrs Newman & Co, Old Court House St., Calcutta. Isinglass and turpentine may be had of Oriental Industrial Co., 16, Bonfield's Lane, Calcutta.

2780 P. L. B., Bombay. Formula for hair removing preparations has appeared several times.

2781 P. M. U., Dacca. Til oil may be refined for the purpose of hair oil by repeatedly filtering through animal charcoal.

2782 C. M. B., Philibit. Book on pickles, etc. may be had of Messrs. Thacker Spink & Co., Esplanade. The following are the addresses required. (1) International Trade Developer, 21, Old Court House Street, Calcutta. (2) Imperial Commerce, 4, Cullum Street, London E. C. 3.

2783 M G R R., Mysore., For books on photography write to Messrs Chakravarty Chatterjee & Co. Ltd, 15, College Square, Calcutta. The following firms deal in photographic materials : (1) The Calcutta Camera House, Chowringhee, Calcutta. (2) Scientific Supplies Co., 29, College St. Market, Calcutta. (3) Amitava Ghose, 33, Canning Street, Calcutta.

2784 F H. B., No previous communication of yours could be traced in this office.

2785 G. M., Calcutta. For silk hosiery goods please enquire of (1) Economic Mills Ltd, 50-2, Dhurrumtolla Street. (2) Gurpar Hosiery Works, 50, Raja Dinendra Street. (3) The Imperial Hosiery, 10, Ram Chand Ghose Lane, Beadon Square ; all of Calcutta.

2787 H. W. F., Bareilly. You may learn the subject at the Calcutta Dental College and Hospital, 261 Bowbazar St., Calcutta.

2788 P. L. A., Muzaffargarh. Formulas for all the articles mentioned by you have appeared in INDUSTRY from time to time.

2789 K. K. B., Kuppam. (1) The following journals will serve your purpose. Export and Import Review, Auslandverlag G. m. b. H., Berlin S. W. 19, Kransenstr 38-9 ; Commercial America, Philadelphia P.O., U.S.A.; British Trade Review, 86, Cannon St, London, E.C.4. (2) Books on Commercial subjects such as you require may be had of the Kamala Book Depot, 15, College Square, Calcutta. (3) Wants to export silk wastes to foreign countries

2790 S. M. T., Muzaffargarh. Formulas of the articles mentioned have already appeared. Carmine is a dye to be had of Oriental Industrial Co, 16, Bonfields Lane, Calcutta. Try Messrs Adair Dutt & Co., 33, Canning Street, Calcutta. For Directory of Chemicals write to the Book Company, 4, College Square, Calcutta.

2791 K. K. C, Kanuj. Matches can be had wholesale from (1) Forbes and Forbes Campbell & Co, Ltd., 13, Lower Chitpur Road ; (2) H. Rashid & Co., 15, Zakaria Street ; (3) Lal Chand Brothers, 33A, Central Avenue ; all of Calcutta.

2792 R. S. M., Alleppey. Nib and button making machines may be had of Bengal Small Industries Co., 91, 91, Durga Charan Mitter Street ; (2) Calcutta Industries Ltd, 71, Canning Street ; both of Calcutta. Artificial leather may be had of Messrs Plummers Bros & Co, 7, Hare Street, Calcutta. Locks, clips, etc may be had of Sparling Patent Lock Works, Aligarh.

2794 S P., Sarawak. For books on horse racing please enquire of Thacker Spink & Co, Esplanade, Calcutta.

2795 R. J. T, Poona It would be advantageous for you to consult an eye specialist.

2797 N. M, Pithapuram. Wants to be put in touch with Godfrey Ermen's Diamond Sewing Thread.

2798 P. K. C, Ganjam. Chinese crackers are made by hand. The method of their preparation is not known. The following are paper dealers of

The Ideal Cooker
FOR THE HOME
New manufactures, cheaper prices & larger output are our aims.
Illustrated Catalogue free
Annapurna Cooker Co.
No 1 A P.O. Thalakwadi.
Belgaum, M.S.M. Ry

China : (1) Bradley & Co., (2) Daishin Co., (3) Winner & Co ; all of Shanghai, China.

2799 M. R. B, Bhera (1) For books on Ayurveda write to Messrs. N. N Sen, 17, Lower Chitpore Road, Calcutta (2) Secretary of the Royal Asiatic Society, Bengal, 1, Park Street, Calcutta 3) Hints on making amla oil appears elsewhere (4) Flasks are manufactured by Harmann Ortmann, Mohrenbach, Thur in Germany. (5) It is now-a days very difficult for an Indian to learn livelihood in Germany and study there (6) Analytical Chemistry by Newth will suit your purpose.

2800 J P. M, Buldana. Please enquire of Messrs S K. Auddy & Co., Wellington Street, Calcutta for second-hand magazines.

2802 A J P., Aurangabad. Chemicals for soap are available at Calcutta Chemical Co, Panditia Rd, Ballygunge, Calcutta Soap moulds are supplied by Eastern Engineering Co, 22A, Shambazar Bridge Road, Calcutta.

2803 D. L: & Sons, Dinapore. Wants to know the address of the Agent at Calcutta for Tokyo Cotton Mill of Japan Will any of our readers help him ?

2804 A K D. M., Vellore. Match machines are manufactured by Bhawani Trading & Engineering Co, 122-1, Upper Circular Road and by Small Industries Co, 91, Durga Charan Mitter Street, both of Calcutta.

2805 B C., Devihosur. Envelop making machines and appliances are supplied by The Oriental Machinery Supply Agency, 20-1, Lal Bazar Street, Calcutta

2806 H B, Moradabad. No such thing as you, mention is known to us,

2809 N K. G., Calcutta. Wishes to be introduced to dealers in wooden toys, etc of Madras

28 0 T V, Masulipatam Answers to your previous letters appeared duly in these columns. The following are a few of the jute mill owners and managers in Calcutta : Birla Bros, 137, Canning Street ; Andrew Tule & Co., Ltd., 8, Clive Row ; Degg Duncan & Co, 2, Hare Street ; Duncan Bros, 101, Clive Street ; George Henderson & Co, 101-1, Clive Street

2815 K S, Madura. The following are a few of the industrial and technical institutions in Germany : Altenburg Technical Academy ; Deutsche Schule fur Optek und Photographie, Berlin ; Charlottenburg Porcelain Factory, Charlottenburg, Berlin ; Cothen Polytechnic, Cothen School for Sugar Industry, Braunschweig ; Agricultural High Schools in Berlin, Bonn Poppels drof, Hotenheim, Weihenstepfan. There are also technical institutions in Aachen, Breslau, Danzig, Darmstadi-Dresden, Hanover, Karlsrubes, Munchen and Stuttgart.

2817 D. M. A, Ahmedabad. Printing machines, small, are supplied by Messrs B. K. Dutt & S. C. Dutt, 100, Durga Charan Mitter Street, Calcutta. Big machines may be bought of K. Banerjee & Co, 133, Canning Street, Calcutta.

2818 M. S. M., Thayetmyo. Bottles in Calcutta are supplied by Messrs C K Das & Sons, 17, College Street ; Ebram Mohamed & Co, 39-1, Canning Street ; Satya Charan Paul, 194, Old China Bazar Street, ; all of Calcutta. Corks may be purchased of P. S. Dutt, 8, Ezra Street, Calcutta.

2820 R. C, Ahmedabad. It is not our custom to give the full names of our querists in the paper. To correspond with the querists you are to address them by number and initials under care of INDUSTRY when your letters will be duly forwarded to you.

2822 D C, Gujranwala. To learn small industries communicate with Dr. J. C. Ghosh, Technochemical Laboratory, 30 2-4, Doctor's Lane. Entally, Calcutta. The vernacular equivalents of chemicals are not all known There is no small machinery to extract essences from flowers. To extract castor oil, the seeds are pressed in country ghunnies. The oil may be refined with animal charcoal.

2823 J. C. C., Chittagong. The book on Soap Making and Allied Industries may be purchased of the Editor, Business World, Datta Villa, Belgachia, Calcutta.

2824 F X P. & Sons, Tuticorin. Mica is available of N. K. Sarkar, 10, Strand Road ; Kodarma Mica Mines Ltd., 10, Strand Road : Kar & Co., 8B, Lal Bazar Street ; Bird & Co., Chartered Bank B'dgs. ; H. V. Low, 12, Dalhousie Square ; all of Calcutta.

2825 H. R. R , Kolar. Dyes for all purposes may be bought of Hansraj Visbram, 13, David Joseph Lane, Calcutta ; Purshotamdas Popatlal & Co., 8, Dean Lane, Bombay ; P. S. Ramakrishnayya, Main Road, Salem. Desires to be put in touch with dealers in household dyes in the principal towns of India.

2827 B. N , Bombay. Soda may be converted into caustic soda by treating this with calcium hydroxide or lime water. Soda or potash lie is made by dissolving ordinary caustic soda or potash. The strength may be increased by adding more caustic soda or potash. To colour oil with alkanet root, drop the roots, previously cut into small pieces into the oil, and when the oil is coloured, filter.

2829 S. M T., Tinnevelly, Desires to buy camphor in solid form in big quantities Try Mitsui Bussan Kaisha, Central Bank Bldgs, Calcutta ; Jamunadhor Saraff, 2 Raghunandan Lane, Calcutta.

2830 M. M , Ahmedabad. Machineries for treating cotton waste are supplied by Messrs H. M. Mehta & Co., 123 Esplanade Road, Fort, Bombay.

2831 P H. & Co., Srinagar. Socks in Hongkong are manufactured by Genz. Wheeler & Co , and War San Knitting Co. Ltd., both of Hongkong. English Directory of the World is published by Kelly's Directories Ltd, London. Please explain what you mean by electric candle.

2832 R. P. S , Patna. The best course for you would be to go through the Indian Companies Act to be had of Messrs R. Cambray & Co, 10 Hastings Street, Calcutta.

2833 N. A. P., Bannu. A recipe of luminous paint appeared in November, 1922 issue of INDUSTRY, which you may please consult.

2835 G. F. M. & Co., Corks are supplied by P S Dutt, 8 Ezra Street, Calcutta. Tin toy making machines may be had of Taylor and Challen, Ltd, Birmingham. The alloy you mean is most probably German silver.

2836 S. & Co., Sailana. Recipes of inks, soaps, etc appear from time to time in the columns of INDUSTRY. You may consult two books on the subject published by Business World Office, Belgachia, Calcutta

2837 S. B. C., Baroda. Wants to buy bromide opals for photography. Try Calcutta Camera House, 158 Dharamtollah Street, Calcutta.

2838 M. A. R., Vizianagram. We publish no German directory from this office. Write to the Consul-General for Germany, 2 Store Road, Ballygunj, Calcutta

2844 B. V. R., Masulipatam. You may go through Kalpaka published by Latent Light Culture, Tinnevelley, S I

2843 N. M. S , Bombay. For envelope making machines write to the Oriental Machinery Supyly Agency, 20-1 Lal Bazar Street, Calcutta.

2849 C. R. N., Calicut. Banian knitting machines are not manufactured in India. These are simply imported. For machines write to Indo-Swiss Trading Co., 17 Pollock Street, Calcutta ; Economic Hosiery Mills, 55-2 Dharamtala Street, Calcutta. Wants address of knitting machinery dealers.

2850 M. L. D., Rahamatpore. We make all attempts to give replies to all questions which fall within the scope of INDUSTRY. For books on Soap and Ink you are referred to No. 2836 above. All previous copies of INDUSTRY are not available.

2852 S. B., Ganjam. A series of articles on dyeing horn and bone appeared in the XI vol. of INDUSTRY.

2854 D. H. G., Bassein. Wants to know Marathi equivalent for Gantheria Fragrantissima.

2855 M. F. Karani. Wants to be put in touch with dealers in building stones of U. P.; importers of school slates, etc.

2856 F. F. C., Pondicherry. Otto phials may be had of B. K. Paul & Co., Bonfield's Lane, Calcutta

2857 B. D. D. C., Muttra. Photo rings are usually imported from France. Try Amitava Ghose, 33, Canning Street, Calcutta

2858 A. K. R., Bijnor. Information regarding market for dried fruits, spices and oils, are to be found in COMMERCIAL INDIA published from this Office. Slate and slate pencils are manufactured by C C Parekh's Slate & Slate Pencil Factory, Petlad, Baroda State. Your other queries being in the nature of advertisements cannot be dealt with here.

2859 N. C. R. K., Fazilka. The best way for you will be to regularly consult the Directory of Reference published in COMMERCIAL INDIA, Shambazar, Calcutta.

2860 G. S., (Nil). Provision dealers are—Issur Chander Coondoo & Co., 167, Dhurrumtola Street, Calcutta; N. R. Khanna & Sons, 71-73, Abdul Rehman Street, Bombay; Oakes & Co. Ltd., 200, Mount Road, Madras. S. Opperheimer & Co. Ltd., 17, Merchant Street, Rangoon.

2861 D. H. M., Surat. The following will serve your purpose: The Mercantile Guardian, 16, St. Helen's Place, London, E. C. 3; Export and Import Review, Krausenstr 38-9, Berlin S. W. 19.

2862 F. C. S., Tanila. You may approach Indo-Swiss Trading Co, 27, Pollock Street, Calcutta with your proposal for mechanical charka.

2864 R. S. N. S., Pittagudi. Spare parts for watches and clocks may be had of Mohamed Ibrahim, 4, Radha Bazar Street, Calcutta.

2866 K. C. K., Gujrat. For nail making machines please enquire of British Engineers Association, 32, Victoria Street, Westminister, London, S. W.

2867 N. K., Rajahmundry. Your query has already been answered under No. 2491.

2868 V. G. P., Berhampore. Photo frames may be had of Roy Babajee, 182, Lower Chitpur Road. Imitation Jari laces may be had of H. Ahmad Hasan Allawala, 69, Khangrapatty, Barabazar, Calcutta.

2870 G. R. R., Tanuku. Glass bottles of the desired shape may be made to order by The Calcutta Glass & Silicate Works Ltd., 101, Cornwallis Street, Calcutta.

2871 P. R. S., Ganjam. Soap, barley, etc. may be had of Sharma Banerjee & Co., 43, Strand Road, Calcutta.

2872 P. B. I., Jalgaon. Knitting machines and yarns may both be had of Economic Hosiery Mills Ltd., 55, Dhurrumtola Street, Calcutta.

2873 K. V., Chendragiri. For information regarding silk-worm write to Director of Sericulture, Madras: For technical books write to Thacker Spink & Co., 3, Esplanade East, Calcutta. Powder the tumeric very finely and dissolve the power in water before dyeing. In Madras the rhizomes of turmeric are boiled in water, to which a little cowdung has been directly added. Afterwards they are dried in the sun for nearly a week, then they are put in the market for sale. Process of manufacturing dry ginger will appear in an early issue. The required formula is not known. For enquiries regarding soil analysis write to Chilean Nitrate Committee, Post Box No. 469, Calcutta.

Expansion of Business

Depends on successful correspondence with attractive stationeries.

Transparent Window Envelopes.

Are the most attractive stationery ever invented for commercial correspondence. It ensures economy with efficiency Write with one anna stamp for complete range of samples. Agents wanted throughout India.

MOHAN & COMPANY,
2, Jegadish Nath Roy Lane, Calcuttta.

2874 D. P. P., Bombay. Wants to be put in touch with cotton and woollen establishment of North and South Malabar.

2875 A. B. S., (Nil). Approach through some local advertising agents.

2876 J. L. S., Aligarh. Importers of wine and spirits are Baria & Co., K. Bldg., Fort Street, Bombay; Sen Law & Co., 52-1, Wellesley Street, Calcutta and R. G. Shaw & Son, 59, Dhurrumtola Street, Calcutta.

2878 B. K. B., Russelkonda. Coloured papers may be had of any stationers among our advertisers.

2880 K. S., Kumbakonam. It would be better for you to engage the services of a practical rice hulling expert.

2884 S. H. S., Ahmedabad. Wants addresses of photo enlargers of Europe.

2885 K. B., Jubbulpore. Formulas for the preparation of the articles mentioned appear in these pages.

2886 S. R. A. N., Balaghat. Your queries have been answered.

2887 J. G. R., Bombay. Recipe for Cologne water appeared in September issue. Recipe of lime juice glycerine appeared in August 1921.

2888 P. M. S., Razole. Coloured bottles and glass sheets may be had of Satya Ch. Paul, 19, Old China Bazar St., Calcutta.

2889 P. R. K. R., Rajahmundry. For learning taxidermy you may serve as an apprentice in any firm of taxidermists.

2891 M. M. Surat. Refer to the 2609 in these columns.

2892 B. S. F., Jharsaguda. For candle making machines please enquire of The Oriental Machinery Supply Agency, 20-1, Lal Bazar St., Calcutta.

2894 D. R. C., Poona. A dilute solution of carbolic acid in water may be sprinkled over ant infested parts to scare them away.

2895 M. H. U., Gauhati. Cigarette making machine may be had of United Cigarette Machine Co., 59, Holborn Viaduct, London.

2896 M. R. B., Bhera. All the chemicals you require may be had of B. K. Paul & Co., 1-3, Bonfield's Lane and Bengal Chemical and Pharmaceutical Co. Ltd., 16, College Square; both of Calcutta. Sulphur may be bought of Surendra Nath Daw & Sons, 6, Doyehatta Street, Barabazar, Calcutta. Other queries have already been answered.

2897 P. C. P., Madras. The following is a list of nurserymen: J. Perrand, rue Cuire, Lyons, France; Grand Prix, Lyon, France; Renault-Godefrey, r St. Marcean 127, Orleans, France; F. Delannay, Voir Angers, Paris, France; R. Frahm, Elmshoru, Germany, Evers Freidrich, Florsheim, Germany; A. Burde, Drossen, Germany; Poluzel Max, Drossen, Germany; H. Hoensveld, Baarn, Holland; Van G. Dinter, Dreumel, Holland; A. Kolloos & Co., Gonda, Holland; Yokoham Nersery Co. Ltd., 21-35, Nakamura Bluff, Yokohama, Japan; Adams J. W. Nursery Co., 718 Chestnut, Springfield, Massachusetts, U. S. A. and Allen Nursery Co., Rochester, New York, U. S. A.

2898 S. M. A. S., Nagina. Your queries have already been replied.

2901 Z. A. S., Etawah. Formula of laundry soap appear in November 1923 issue. A good recipe of tooth powder will be found in June 1922 issue. An article on boot polish appeared in June 1923 issue. Formulas of hair dye appear elsewhere in this issue. For hair oil please go through Hair Oil Manufacture published from this office.

2903 S. K. P., Mayavaram. You may sell the old cotton cloths in the market. For destroying pimples, seek medical advice. Other queries are not in our line.

Swiss Make
Guaranteed Watches.
Free Packing, Postage and V. P.

Railway Regulator	Rs 4-6-0
Wrist Watch Nickel	Rs. 5-8-0
„ „ Rolled Gold	Rs 7-8-0

Well shaped, Beautiful and Accurate.
LICHO WATCH CO., Bombay No 4

2904 L. N. C., Rabon. Caustic soda may be supplied by Bengal Chemical & Pharmaceutical Works Ltd., 15, College Square; B. K. Paul & Co., 1-3, Bonfield's Lane; both of Calcutta. Wants regular supplies of gingelly, groundnut, coconut, mohwa, castor and rapeseed oils. Soap moulds may be had of S. L. Dutt & Co., Murari Pukur Road, Manicktola, Calcutta. Cardboard boxes may be supplied by H. L. Sett & Sons, 8-1, Nilmoney Mitter St. and Dass and Kundu, 20, Gour Laha St., both of Calcutta. Corks and glass bottles of all descriptions may be bought of Satya Charan Paul, 194, Old China Bazar Street and S. K. Dey, 120, Shova Bazar Street: both of Calcutta.

2906 S. A. G., Rangoon. There is no process of manufacturing phenyle at so cheap rate. An article on phenyle manufacture appeared in October 1921 issue.

2907 D. D. S., Layallpur. Hosiery goods may be had of E. B. Bros. & Co., 11, Dharamtola Street, Calcutta. Hosiery goods may be supplied by E. Frite Buttner, Chemnitz i. Sa, Bruckenstr. 8, Germany; Brettle George & Co. Ltd., 119, Wood Street, London E. C. 2 and Chipman Knitting Mills, Easton, Pennsylvania, U. S. A.

2908 J. M. C., Cachar. For the required machines you may write to The Oriental Machinery Supply Agency Ltd., 20-1, Lall Bazar Street, Calcutta. For starting small industries please go through September 1923 issue of INDUSTRY.

2910 S. K. M. C., Nagpur. Wants to be put in touch with dealers in waste rubber and motor tyres. For insurance write to Gillanders Arbuthnot & Co., Gillanders House, Clive Street, Calcutta.

For wholesale price list of Hosiery yarns, Knitting materials and Haberdashery write to—

E. B. BROS & CO.,
11, Dharamtala Street,
Calcutta.

2916 H. S. F., Bangalore. Candle making apparatuses may be supplied by Calcutta Industries Ltd., 71, Canning Street, Calcutta.

2918 F. K., Rath. You may try Kelly's World Directory published by Kelly's Directories Ltd., London.

2920 D. K. C., Poona City. Electric motor and dynamos may be had of Mc. Lawrie & Co., 17, Ezra Street, Calcutta who will also supply every particular. Grinding mill may be supplied by Messrs Burn & Co., 7, Hastings Street, Calcutta.

2921 D. B. S. S., Erode. For books on printing enquire of Messrs Thacker Spink & Co., 3, Esplanade East, Calcutta.

2922 P. E. K., Bombay. You may refer your enquiry to Prof: G. S. Bhannah, Krishna Row Square, Madura.

2923 L. D., Paiker. For match making machines write to Bengal Small Industries Co., 91, Durga Charan Mitter Street and Bhawani Engineering and Trading Co., 122-1, Upper Circular Rd; both of Calcutta.

2924 U. D., Vellore. You may go through Match Industry by Mr. K. C. Sen, to be had of Bhawani Engineering & Trading Co., 122-1, Upper Circular Road, Calcutta.

2925 L. D., Lahore. Pearlash is potassium carbonate while sajjimathi is sodium carbonate, both are crude. Sodium carbonate; washing soda and soda crystals denote one and the same thing. Yes, you may use silicate of soda as filling agent to soap. But in most cases soapstones are used. Whiteness of the soap is due to excess of alkalies; to neutralise please add more fats or oils. Good washing soap will lather naturally. Pearlash may be supplied by Bengal Chemical & Pharmaceutical Works Ltd., 15, College Square, Calcutta.

2926 H. N. S., Unao. For literature on mohwa oil industry write to Messrs Thacker Spink & Co., 3, Esplanade East, Calcutta.

2927 S. M. K., Sonpur. Add sodium silicate as a filling agent after adding the lye. The formula and the direction given are all correct. In some cases sodium carbonate is mixed little at a time in order to neutralise completely. For measuring consistency of the lye you are to secure a hydrometer of required grade which may be supplied by Bengal Scientific Supplies Co., 29, College Street Market, Calcutta.

2928 R. M. P. B., Bombay. Mix a little quantity of til oil to the coconut oil and put some amla in it for some 15 days, place in the sun, decant and use. It will cool the brain to a certain extent when used. For syrup making please go through Syrup Manufacture published from this Office.

2929 P. I. C., Kathiawar. Tin pots may be had of Gajanand Rampratap & Co., 5, Halsi Bagan Road, Calcutta.

2930 A. A., Arrah. A list of foreign journals and periodicals will be found in last September issue Query column under no 1710.

2931 M. D., Jamadoba. For selling minerals you may correspond with Calcutta Mineral Supply Co, 31, Jackson Lane, Calcutta. If you just go through the book on Hair Oil you will be able to calculate the expenses yourself. We have no publication on soap. Your other queries will appear soon.

2932 P. M., Baroda. For imparting red colour to hair oil you may use alkanet roots. For other colour you should use aniline dyes. Process of preparing castor oil for medicinal purposes will be found in September 1024 issue. Formulas of patent medicines are not known. Your other queries are outside the scope of INDUSTRY.

2934 M. Q. B. B., Dera-Ismail-Khan. For the required machine write to Messrs Burn & Co., 7, Hastings Street, Calcutta. For securing agency you may write direct to Dunlop Rubber Co., Ltd, 8, Lindsay Street, Calcutta.

2936 K. Z. T., Chittagong. Just go through the advertising pages of INDUSTRY where you will find almost all the required addresses. If not, general merchant and order suppliers will supply you the articles.

2937 N. K. S, Atara. Aniline dyes may be had of Aminchand Mehra & Sons, 34, Armenian Street, Calcutta. To dipose of bristles write to H. Devis & Co., Cawnpur; Brushwares Ltd., 125-1, Halsey Road, Cawnpur and Bonner & Co., 209, Cornwallis Street, Calcutta.

2938 S. R., Rasra. For carbon construction you should read works on chemistry. Retort carbons may be supplied by B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. For carbon pressing machines enquire of Calcutta Industries Ltd., 71, Canning Street and Eastern Engineering Works, 22A, Shamnazar Bridge Road; both of Calcutta. Recipe of python eggs will be found in September 1924 issue.

2939 M. A., Bakhtawer Khera. Corrosive sublimate is a very effective antidote against white ants. Creosote is a product of coaltar distillation. Floor cement is available in the market.

2940 S. D. C. W., Cuttack. Cardboard box making machines may be supplied by The Oriental Machinery Supply Agency Ltd. 20-1 Lall Bazar Street, Calcutta. Olive oil may be had of B. K. Paul & Co., 1-3 Bonfields Lane, Calcutta.

2943 A. B, Roath. Reply to your queries appeared in the last December issue in the Query column under No. 2413.

Limitation of Family.

Third Ed. 5 Portraits, 55 Engravings.

357 Pages, Price Rs. 3. Postages extra.

A comprehensive and Confidential Treatise Every parent desiring to regulate the number of children according to his health and means will find it a god-send, ask for table of detailed contents which will be sent free. K. M DAS & CO. 29-1, Telepara, Sampooker St., Calcutta.

NOTICES AND REVIEWS.

New Year Calendars.

Our sincerest thanks are due to The Mahabir Press, Fine art printers, publishers, book binders etc , Kinari Bazar, Agra for a very serviceable sheet calendar with bold types received from them.

Messrs Mukherjee Bros. & Co., 17-19, Shambazar Bridge Rd., Calcutta, who have favoured us with their artistic calendars, are well-known tea merchants, stationers and order suppliers.

We are indebted to Messrs P. Orr & Sons Ltd., of Madras and Rangoon in respect of a calendar with a picture of the Orr Pen

We have much pleasure in acknowledging receipt of a calendar bearing a beautiful tricolour print of Sree Krishna from the Punjab Perfumery. Works of Calcutta.

We have received nice calendars from Mr. B. N. Bysack, Rubber Stamp Manufacturer, 1-1, Ram Chand Ghose Lane, Calcutta.

Our acknowledgments are due to The Eastern Astrological Hall, Vizagapatam for attractive calendars received.

We are thankful to the Mazumdar's Advertising Agency, 11, Guruprosad Ray Lane, Hatkhola, Calcutta for their kind compliments accompanying a useful date card.

We acknowledge receipt of (1) calendar from Messrs Pallampati Anjaneyulu & Sons, Diamond merchants, Godugupet, Masulipatam ; (2) an almanac from Bombay Trade Developing Agency, Pudukotah, S. India ; (3) a calendar from the German Novelty Stores, Cocanada, wholesale and retail dealer in miscellany.

A very charming calendar with multi-coloured picture has been received from Messrs D. G. Gore, New Sayana Building, Lohar Chawl, Bombay No. 2. They are importers of essential oils, perfumes, chemicals, and sundries, etc, etc.

New Year Greetings.

We reciprocate the compliments with which the senders of the greeting cards have congratulated us and wish them, one and all, a happy and prosperous new year.

Boot Polish.

Boot polish, both black and brown is being prepared by Messrs A. P. Lingam & Co., Tuni from indigenous materials. It is intended to make the leather soft and to impart a high polish.

Alexir.

This is a remedy for plague, cholera and snake and mad dog bite prepared by Messrs Kapur Brothers, Lohar Mandi, Lahore.

Inks.

Samples of blue black, red and green inks have been received from Mr. Kakamani C. Krishnaiah Setty, Radha Ink Factory, Hindupur. The products are satisfactory.

A Directory.

Trade List of Madura 1925 (Current) published by Messrs G. R. Chattu & Co., 86, East Veli St., Madura. Price As. 4. It contains a complete list of all merchants and manufacturers of Madura, a noted trade entrepot.

Aluminium Name Plates.

Aluminium name plates may be made to order by the Royal Advertising and Manufacturers' Agency, Nagpur City. Fixed on pieces of furniture, sticks, umbrellas and dog collars, packing cases, etc. they will be found useful for identification purposes. We wish every success to this simple home industry.

Indian Match Manufacturers Association.

Credit is due to the Indian Match Manufactutrers' Association for their earnest endeavours in safeguarding the infant match industry in this country. Among other things done by the Association, it has succeeded in enlisting the sympathy of one of the most important Indian Railways from which it expects a substantial reduction of freight for the carriage of raw materials, required for match manufacturing purposes. It has approached the Government of India with proposals for the introduction of central legislative measures to guard the interest of the Indian manufacturers against foreign enterprisers It has also made vehement protest to the Tariff Board against the imposition of any enhanced duty on paper used for match maunfacturing purposes. With a view to make the Association more representative by recruiting new members it is offering certain facilities for membership, particulars of which may be had from the Office at 122-1, Upper Circular Road, Calcutta.

The Volunteer.

Edited by Mr. N. S. Hardikar, Published at The Karnatak Printing Works, Dharwar. Annual Subscription Rs. 3.

The pages of this journal will be devoted to record the deeds of the Hindusthani Seva Dal, an All-India Volunteer Organisation. It will achieve much if it succeeds in inspiring the young volunteers with the ideal of service and to train them to work for the welfare of India and Indians with spontaneous enthusiasm.

An Home Industries Association.

The home industries exhibition organised by the Ram Krishna Mission, Belur near Howrah, and held in the Math premises on 21st December, 1924 was a successful one for the first attempt. We wish to see it grow up into an annual function and more representative of the home industries of Bengal. Though there were some good exhibits of cottage industries, the handiwork of purdahnashin ladies predominated. To mention only a few important items Babu Anil Krishna Datta of 90, Khetra Bannerji Lane, Shibpur, Howrah has been very successful in producing coloured matches, (red, blue and green) of good quality. Damp proof matches are made by The Nalini Match Factory Co., 122, Raja Dinendra Street, Calcutta. Some very artistic knitted goods have been shown by Babu Rash Behary Dass, 105, Sita Nath Bose Lane, Salkia P. O., Howrah. There were clay models, relief maps, paper flowers, dressed pictures, etc. A map of India has been nicely drawn on a handkerchief. Embroidery work has been exquisitely performed on a chaddar. Skill and clevery have been manifested in the utilisation of many waste products such as fish scales, worn-out stockings, etc.

Trade Enquiries.

[Letters to the parties are to be addressed by number and initials under care of INDUSTRY when these will be duly redirected]

2812 A. E. O. M. H., Rangoon. Can supply cutch in very large quantities.

2826 B. D. B., Akyab. Wants to be put in touch with wholesale dealers in tea.

2827 D. S. B., Hologuri. Can supply dried amla.

2834 G. K. N., Pudukotah. Can supply grapes, mangoes, tamarind, wood apple, coconuts and seeds such as margosa.

2881 V. R. R., Triplicane. Wants a capitalist to invest in forest business.

2933 A. K. N., Dacca. Desires to be put in touch with dealers in brooms made of straw.

2935 M. D. F., Panadure. Wants to be put in touch with dealers in paraffin.

2942 N. K. M., Rajahmundry. Wants a capitalist to start a match factory.

2961 D. P. C., Chandernagore. Wants a capitalist to invest in some profitable business.

2984 P. K. J., Perademiya. Wants expert advice on glycerine extract.

3109 P. K. J., Calcutta. Desires to be introduced to dealers in soap stone and wants glass expert.

3124 P. N. N., Egnore. A graduate of the Madras University efficient in survey and revenue works wants a suitable job.

3159 K. Metharam, P O, Box 828, Cairo, Egypt. Wants to be put in touch with the jute manufacturers and exporters.

3179 P. A. S, Ponani. Wishes to be introduced to dealers in sandal wood.

3184 K. M., Berhampur. Wants to be put in touch with dealers in iron ore.

3185 P. N. C, Nainital. Desires to be introduced to Tibetan wool dealers.

3188 L H. S., Sholarpur. Wants a partner with a capital, of Rs. 5000 to start a profitable business.

3192 H A., Mandalay. Desires to be introduced to dealers in carpet used in Burma.

3197 U. P. E. W., Hathras. Can supply hog, swine, pig, and horse bristles.

Notice.

Those letters answers to which could not be prepared in time for this issue will be treated in our next.

February Issue of Industry.

(*In the Press.*)

The January issue of Industry will contain articles on Sugar of Milk, Glazed Bricks, etc in addition to Formulas, Small Trades, New Ideas and other useful features. Any friend of our subscribers may get a copy free as sample on application to Manager, INDUSTRY, Shambazar, Calcutta.

INDUSTRY

Is a monthly Journal of Technology and Handicrafts, Science and Commerce, Agriculture and Business The rate of subscription is as follows:—

Indian Rs. 3 Foreign Rs. 5-4.

The charge is for complete yearly volume only, inclusive of postage

Single Copy As. 5 only.

BUSINESS NOTICE.

Industry is published at the end of every month

Subscribers are enlisted at any time of the year but they will receive only the number from April to March comprising a complete volume for one year's subscription.

At the time of sending a V P.P. only the current number is generally sent. The previous issues of the volume are sent per book-post on receipt of the value of the V.P.P. For particulars and Advt rate please write to—

Manager, INDUSTRY OFFICE,
Shambazar, Calcutta.

Managing Editor—MR. K. M. BANERJEE.

INDUSTRY

A Journal of Technology, Handicrafts & Commerce

Vol. XV. CALCUTTA, FEBRUARY, 1925 No. 179

Looking on the Bright Side.

1925 is perhaps the first year after that fateful year 1914 that shows any sign of return to normality in the affairs of nations. The repercussions of a decade of destruction by war and reconstruction in peace are settling. The re-adjustments in which governments and peoples, statesmen and laymen, scientists and philosophers have made common cause are beginning to bear fruit. The international relations are decidedly bright, European problems are nearing solution, everywhere there are indications of economic recovery. In a word the aftermath of War is subsiding. The process may be slow but it is sure.

Nearer home the outlook in India may be safely pronounced hopeful. A policy of discriminate protection has been inaugurated to safeguard Indian industries. The prospects of inland and foreign trade are reassuring as financial stringency is slackening. A number of new industries have been established in this country. The trade with continental Europe is gaining ground as in pre-war days. New schemes of engineering and hydro-electricity are being undertaken. The net-work of railways and irrigation canals is extended criss-cross. Easy facilities for communication and transport are afforded. The public works of the Government and other corporate bodies are being speeded up. All these will provide ample opportunity particularly to trained experts and cxperienced businessmen. In fact enterprising pioneers have already engaged themselves in industrial and commercial activities.

If we may diagnose this forecast aright a period of prosperity is ahead of us when those that are engaged in industry and trade could easily prosper. And those that are contemplating to enter the field anew ,could easily secure a footing if they would. But woe to those who would not bestir themselves and prefer to bide time.

The prognostications after all may prove false, wholly or partly, or unforseen events may turn up shattering all expectations. But let us hope for the best : it pays to be an optimist. Let us strive together to bring about the revival which is the desideratum of all. Be prepared therefore to avail yourself of this unique opportunity and success will be yours. Be ready to court prosperity if and when it comes.

Making it easy for all to tread in at this momentous juncture INDUSTRY has prepared a wide field. It has moreover created an atmosphere of industrial activity favourable to the nurture and growth of new enterprises. It has analysed the economic situation from time to time. It has explored the possibilities even in times of slump.

A journal which has befriended its readers in times of adversity will surely not fail to urge them forward in time of prosperity. It will now endeavour to probe into future prospects and lay bare the potentialities. Naturally in the bustle of economic progress want of foresight may lead to insecurity. But INDUSTRY will warn you of pitfalls and injudicous undertakings. You will therefore feel the need of its services now all the more.

You must have realised by this time that the information furnished by INDUSTRY are your greatest assets: Armour yourself with these weapons for the battle of life. Equip yourself to the full with knowledge culled from the pages of INDUSTRY. For knowledge is power and a well-informed man is hard to beat. Learn the pros and cons of this industry and that trade from its pages. Consider the schemes and scrutinise the estimates offered.

Howsoever, it is to you to profit by our advice. You must exert yourself. You must put into execution the mission of INDUSTRY as its accredited representatives. For what can INDUSTRY achieve without your practical assistance? How can the longed for industrial renaissance of India be brought about without hearty co-operation of its readers ?

Comb-Cutting.

ONE of the methods of forming the teeth of combs is by means of a double saw, which consists of two separate fine saws, placed parallel with each other, and adjusted to such a distance from each other as to embrace a tooth of the required fineness between them. These two saws are so arranged that, while one cuts into the comb to the full depth required, the other cuts only about half that depth, and by this contrivance the uniformity of the comb is secured, because, while the deeper saw is completing the first cut, the shallower one is forming the commencement of the of the second, and when, on the completion of the first cut, the deep saw is put into the second cut to complete it, the shallower one immediately commences a third. The cuts thus formed are subsequently enlarged and rendered smoother by means of a very thin wedge-shaped file, which also points the teeth. A much more quick method of performing the same operations is by means of circular saws and revolving cutters for pointing the teeth.

By the above methods of comb-cutting all the material [illegible] the interstices between the teeth is lost or destroyed, but by the operation known as the "parting of combs" such loss or waste of material may be avoided in the manufacture of combs of tortoise shell, horn or any tough material. Two combs are by this process, made out of one piece, the teeth of one being cut, by the pressure of chisel-like instruments, out of the interstices of the other.

INDIA'S INDUSTRIAL PROGRESS.

Yarn Testing in Bihar.

Handloom weavers in Bihar and Orissa as in other parts of India are very much handicapped in the purchase of their yarn for want of facilities for testing it in the matter of counts, twist and length of yarn in the hanks and weight of the bundles. To remedy this the Government of Bihar and Orissa have established a fully equipped station where the counts, strength, twist, etc, of yarn sold to weavers may be tested.

This station is now at Gulzarbagh, Patna and can undertake the testing of yarn for weavers of co-operative societies and the general public. The following tests among others will be carried out, viz., testing in regard to (1) counts, (2) strength, (3) twist per inch, (4) length in the hank (5) weight in the bundle, (6) quality, including cleanliness, evenness, etc. and (7) in the case of dyed samples, fastness of colours. Tests will be undertaken free of cost for the present for bonafide home weavers and co-operative societies in Bihar and Orissa. A fee of one rupee per test will be charged to others or to those not belonging to the Provinces. Samples should be addressed to the Superintendent of the Cottage Industries Institute, Gulzarbagh, Patna, from whom further particulars may be obtained.

Scope for Paper Mills.

One of the industries of India which has shown little or no progress during the past decade is that of paper-making. At the present time there are twelve paper mills in India with an authorized capital of 50 lakhs of rupees. Only five of this number, however, are working on up-to-date Western lines, and these are at Titagarh, Kankinarah and Raniganj in Bengal, at Lucknow in U. P. and at Poona in Bombay. The aggregate output of these mills is very far below the actual needs of India. Not only is there an urgent need of a greater output from the existing mills but there is a great need of more paper mills to cope with the increasing demand. Though the existence of the paper industry depends mainly on the supply of Sabai grass it is not as extensively grown as it should be. With a view to ensure a regular and adequate supply of this important raw material its cultivation may be greatly increased.

Reversible Rails in India.

In the opinion of the Chief Engineer of the East Indian Railway double-head rails of the old reversible type, originally used on British main-line railways, are preferable to the more modern type of bull-head non-reversible type now generally used. Doublehead rails as laid originally had the lower head resting on the cast iron chairs and thus became extended so as to form a rough surface when inverted or reversed. With the cast iron plate and pot ties used extensively in India, the rail is supported by its upper hand resting on bearings, the lower head being free of any support.

Milk Sugar.

MILK sugar, from which homeopathic globules are manufactured, is said to have been discovered by accident early in the eighteenth century by a peasant in Switzerland who was making cheese. The cheese having been hung up in a bag to drain for some time, this observing Swiss noticed a few crystals that had been formed by the evaporation of the whey. A druggist, to whom these crystals were shown, predicted that, if the product could be manufactured in quantities, it would become an important article of commerce. In the first half of the nineteenth century, milk sugar was being manufactured by very crude methods in Switzerland, Holland and Germany. The sugaring processes occupied about fourteen days and the product then contained many impurities. But there was great demand for even this impure product and the industry grew. Switzerland controlled the milk sugar industry, and supplied the markets of the world.

Milk sugar or lactose is probably found in the milk of most mammals, and, so far as known, is found nowhere else in nature. The milk sugar of commerce is derived from cows' milk of which it forms about five per cent. It is but slightly sweet, hardly a hundredth as sweet as cane sugar.

This product is used in modifying milk for feeding infants and invalids, as a diluent in various strong drugs in the preparation of medicinal powders, and in the manufacture of pentanitrolactose, which forms a part of some high explosives. Several methods of its manufacture are described below : —

(1) The bulk of the fat of milk is removed by a separator for butter making, and "separated" milk heated to from 75° to 85°C., and treated with 10 c. c. of milk of lime, whereby the residual fat and casein are precipitated Saturation with carbon dioxide follows, as in the purification of beet root juice and the purified liquid is concentrated and the milk sugar crystallised. It may be purified by dissolution in water and precipitation by alcohol. This may be regarded as a purely pharmaceutical preparation.

(2) The manufacture of crystallized milk sugar has developed greatly in recent years, and a perfectly white well-crystallized product is now obtained. For its preparation, the sweet skim-milk as it comes from the cream separator is precipitated with acetic acid, filtered, and boiled either in open steam-heated evaporators or in vacuum pans. This first boiling should take several hours. The whey during the boiling becomes more cloudy, but suddenly clears, and the remaining albuminoids will separate in large flocks that can readily be filtered. It is to be filtered hot and boiled to crystallization in a vacuum pan. The raw sugar so obtained can be refined and made white by a process similar to that used for cane sugar.

(3) On a small scale it is best to precipitate the protein from milk or whey by as small a quantity of acid mercuric nitrate as possible. The clear filtrate is neutralised with dilute caustic soda solution till a very faint tinge is given with phenolphthalein ; it is filtered from the precipitate thus produced, which consists of mercury salts. Sulphuretted hydrogen is passed through the clear solution to remove the mercury oxide dissolved by the sugar, and, after filtration from mercuric sulphide, the sulphuretted hydrogen is expelled by boiling. On evaporating the solution, milk sugar crystalizes out ; crystallisation may be hastened by vigorous stirring of the concentrated solution while it is being rapidly cooled.

(4) Whey, acidified to about one per cent of hydrochloric acid, is heated in large vats to the boiling point with

steam. This precipitates the albumen. The solution is then made neutral with calcium hydroxide, evaporated in a vacuum pan to a syrupy consistency (25°Be) and filtered through a series of cloths in a high-pressure filter press. When sufficient syrup has accumulated, it is again run into the vacuum pan and evaporated, at about 110°F., to a much richer syrup. This latter is drawn out into shallow boxes, where it cools and crystallizes, in 24 to 48 hours, into what appears to be a yellow sand. This is crude sugar, and must be passed through several processes of purification.

(5) Sugar of milk is prepared by the addition of diluted sulphuric acid to the whey of cow's milk, and by subsequent evaporation, the albuminous matter is coagulated ; this is filtered out and the liquid set aside to crystallize. Animal charcoal is sometimes used to decolorize the solution.

Sugar of milk occurs in white, hard, crystalline masses, or as a white powder, producing a gritty sensation on the tongue. It is permanent in the air. It readily absorbs odours. Sugar of milk is a useful diluent, and is largely used in medicine and pharmacy.

Milk sugar is converted by boiling with dilute acids into dextrose and galactose. It undergoes the lactic fermentation readily but the alcoholic with some difficulty.

The most important of the products derived from milk sugar is formed by the action of certain micro-organisms on milk-sugar during the so-called lactic fermentation. By their action the milk sugar is split up into lactic acid almost quantitatively, a certain portion, however, being converted into other products.

The Home Bakery.

[By A. Practical Expert.]

BREAD.

(1)

Good flour	17 lbs.
Salt	4 oz.
Yeast (hop)	5 ,,
Hot Water	1 qt.

First dissolve the salt in hot water. Throw in a portion of the flour and mix in the whole of the yeast. Set aside in a warm place until the mass ferments. Then add another portion of flour with a quantity of hot water and set aside for 3 to 4 hours. Now add the remainder of the flour and knead thoroughly into a suitable dough. The breads are formed from this prepared flour with oiled tin moulds and baked in an oven.

(2)

Good flour	20 lbs.
Yeast, toddy	6 oz.
Salt	3 ,,
Alum	1 ,,

First dissolve the salt in hot water and add to the flour. Mix the yeast thoroughly into it and set aside for 3 to 4 hours to ferment. Next dissolve the alum in hot water and add to the above. Knead the flour into a suitable dough. Put into moulds and bake.

(3)

Good flour	1 lb.
Yeast (hop)	½ oz.
Salt	1 dr.
Baking powder	2 spoonful

Dissolve the salt in hot water and add the solution to the flour. Mix in the yeast, and set aside for 3 or 4 hours. Then incorporate the baking powder and knead into a dough. Put into moulds and bake.

(4)

Good flour	1 lb.
Salt	1 dr.
Yeast	1 ,,
Toddy	1 oz.

Dissolve the salt in hot water and pour the solution on the flour. Next mix in the toddy and set aside for 4 hours. Now add the yeast and knead into a dough. Mould into breads and bake on oiled trays.

BISCUITS.

(1)

Fine flour	2 lbs.
Carbonate of ammonia	3 dr.
White Sugar	4 oz.
Arrowroot	1 ,,
Butter	4 ,,
Egg	1
Milk	q. s.

Take the contents of the egg in a bowl, add the butter and beat to a cream. Pour the froth on the flour, add the other ingredients, and knead to a dough with the requisite quantity of milk. Roll it out to ¼ in thickness, make incisions with a fork and punch out with choice die stamps. Bake these pieces in a moderate oven for 15 mins. Pack the biscuits in a tin canister while still warm. They will keep long.

(2)

Flour	½ lb.
Sugar	4 oz.
Butter	4 ,,
Carbonate of ammonia	1 dr.
Eggs	2
Vinegar	q. s.

Mix the sugar and butter with flour. Incorporate the carbonate. Beat the egg pulp with vinegar and knead the mixed flour with it. Then proceed as above.

(3)

Flour	½ lb.
Carbonate of Soda	15 gr.
Sugar	2 oz
Milk	4 ,,

Beat the butter and add the flour. Incorporate the soda and knead the whole into a dough with milk. Make the mass into a rod-like roll ; cut out pieces one inch thick ; make incisions into them ; bake and pack airtight.

(4)

Flour	2 oz.
Sugar	2 ,,
Lime marmalade	½ ,,
Egg	3

Separate the white and the yellow portion of the eggs. Beat the white portion in a bowl with a wooden spatula until it becomes frothy. Then mix in the marmalade finely disintegrated. Now add gradually flour and sugar : and also the yolks of egg beaten to a froth. Mix the whole mass thoroughly with a spoon and knead into a dough. Roll out into ¼ inch thickness. Make incisions with a fork and sprinkle over with powdered sugar. Punch out ; transfer the pieces on oil paper. Bake in a moderate oven so that they might not be scorched.

(5)

Arrowroot	1 lb.
Butter	4 oz.
Sugar	4 ,,
Vinegar	q. s.

Mix together all the ingredients and knead into a dough. Roll out to ¼ in thickness, punch out ; prick them and bake :

(6)

Flour	2 lbs.
Butter	3 ,,
Sugar	6 oz.
Ginger powder	2 ,,
Milk	q. s.

Mix together all the ingredients and knead into a dough. Roll out to ¼ in thickness, punch out ; prick them and bake.

CAKES.

(1)

Flour	1 lb.
Sugar	1 ,,
Almonds	½ ,,
Eggs	7
Lime juice	1
Rosewater	q. s.

The sugar should be powdered and sifted ; the skinned almonds brayed in rose water. Beat the white portion and the yellow portion of the eggs separately for half an hour. Mix all the ingredients except flour and pound together for half an hour. Then add flour and knead thoroughly. Mould the dough into cakes of desired shape and size ; put into paper moulds and bake carefully in an oven.

(2)

Flour	2 lbs.
Sugar	1 lb.
Butter	1 ,,
Nutmeg	1 oz.
Mace	½ ,,
Currants	2½ lbs.
Almonds	½ ,,
Orange marmalade	¼ ,,
Brandy	10 oz.
Orange flower water	3 spoonful
Egg	16

Beat the butter into cream ; mix the sugar. Add to this mixture the white of the eggs beaten to a froth. Also add the yolk similarly beaten. Powder the spices, mince the raisin and ground the almonds. Now mix together all the ingredients and knead into a dough. Make cakes of desired size and shape from this mass. Put them in buttered tin moulds lined with oil paper. Bake in a very show oven for a couple of hours otherwise all the ingredients will not be cooked. Be careful not to burn them.

(3)

Flour	2½ lbs.
Butter	2 ,,
Raisins	12 oz.
Currants	½ lb.
Sugar	18 oz.
Candied Orange	3 ,,
,, Lime	3 ,,
Nutmeg	½ dr.
Mace	¼ ,,
Eggs	14
Brandy	1 cupful
Orange water	4 spoonful

First beat the butter into a cream ; mix the sugar. Then add the eggs beaten to a very strong froth. Now mix together all the ingredients except brandy. Knead for half an hour. Add the brandy little by little.

Finally proceed as above.

(4)

Flour	1 lb.
Sugar	1 ,,
Raisins	1 ,,
Butter	1 ,,
Eggs	10
Lemon Oil	

Beat butter to a cream ; mix the sugar. Add the eggs beaten to a strong froth. Now add raisins and a few drops of lemon oil and work well. Finally add the flour and knead into a dough.

Then proceed as above.

(5)

Flour	4 lbs.
Sugar	3 ,,
Butter	4 ,,
Eggs	3 doz.
Rose water	5 spoonful
Carraway seed	6 oz.
Tinct Cinnamon	

Take refined sugar ; grind and sift it : and place it near an oven to keep it dry. Put the butter in a deep dish and and beat to cream, Beat separately the yolks of the eggs and the whites of only 16 of them. Mix these with the butter thoroughly. Add rosewater, then carraway sugar and flour. Knead for a couple of hours scenting with tincture of cinnamon. Mould into cakes put into forms and bake gently for 3 hours.

(6)

Fine flour	1 lb.
Refined sugar	1 ,,
Butter	1 ,,
Eggs	8
Dry dates	½ lb.
Almond	½ lb
Saffron	⅛ tola
Brandy	5 oz.
Rose water	2 spoonful

First beat the butter to a cream ; mix the sugar and add the yolks and whites of eggs beaten separately. Now add one by one flour, saffron, brandy and rosewater and knead into dough. Now mince the dates into fine chips and grate the almond into the above mass. Mould into cakes ; put into forms and bake carefully.

(7)

Fine flour	1 lb.
Refined Sugar	1 ,,
Fresh Butter	1 ,,
Pistachio	8 oz.
Raisins	8 ,,
Nutmeg	¼ tola.
Saffrom	⅛ ,,
Rosewater	2 spoonful
White wine	2 spoonful
Eggs	10

Beat the butter to a fine cream, mix the sugar, Beat the eggs to a strong uniform froth. Add to the above. Grate the nutmeg : dissolve the saffron in rose water. Now leaven the flour with wine and knead it with the above ingredients. Incorporate pistachios and raisins. A suitable dough will be obtained after half an hour. Mould into cakes, put into forms and bake,

(8)

Flour	1 lb.
Sugar	1 ,,
Butter	1 ,,
Yeast	1 cup
Carraway	1 oz.
Eggs	5

Mix the flour with the butter, then beat the eggs with yeast and add the sugar. Pour the froth on the flour, sprinkle over the carraway and knead into a dough. Make small cakes and bake.

(9)

Flour	3 lbs.
Butter	2 ,,
Sugar	2 ,,
Eggs	2 doz.
Nutmeg	2 drs
Mace	2 ,,
Brandy	2 spoonful.
Raisins	4 oz.

Beat the butter : mix with it flour and sugar. Add the yolks of 24 eggs and the whites of only 12 eggs ; knead well with the wine. Now incorporate the nutmeg, mace, and raisin. Mould into cakes, put into form and bake.

(10)

Flour	1 lb.
Sugar	1 ,,
Butter	1 ,,
Rose water	2 spoonful
White wine	2 ,,
Eggs	10

Mix together flour, sugar and butter and knead thoroughly until a suitable dough is obtained. Now add rosewater and wine and the contents of the eggs. Incorporate thoroughly. Mould into cakes ; put into buttered moulds and bake.

(11)

Flour	9 lbs.
Salt	1 spoonful
Cinnamon	⅓ oz.
Mace	2 dr.
Clove	1 ,,
Nutmeg	1 ,,
Sugar	12 oz.
Butter	1⅓ lb.
Cream	1 qt.
Ale yeast	1 pint.
Wine	5 oz.
Ambergris	3 gr.
Eggs	8
Rosewater	5 oz.
Currants	1 lb.
Raisins	3 ,,

Powder the spices and sift them. Beat the whites and the yolks of the eggs separately. Mix the whites of four of the eggs with rose water. Mince the currants.

Mix together the powdered spices and salt and add sugar. Next work the flour with butter for 3 hours. Knead the mass with yeast, wine, ambergris and rosewater. Keep the dough near an oven. And the currants, raisins and the spices and keep in a hot place for 3 hours. Finally add the contents of the eggs ; work well ; mould into cakes, put in forms and bake.

INSTRUCTIONS.

In the making of bread the flour must be leavened with an yeast as of hop or toddy and left overnight for fermentation. This process ensures a light and spongy bread. In preparing biscuits eggs are added for crispiness ; chemicals for preservation ; and essential oils etc., for taste and scent. The contents of the eggs should be beaten to a froth in every case for half-an-hour with an egg-beater. The dough should be rolled out to a uniform thickness and pricked with a fork for aeration. The roll-spread should then be punched with die stamps engraved with designs of desired shape and size; and sometimes with toothed or milled edges. In the manufacture of cakes the richer the ingredients added the more palatable the products will be. The dough is worked carefully ; moulded into cakes of fancy shape and size ; put into tin forms lined inside with buttered paper and baked.

In general great care must be taken in the baking process so that the articles may neither be under-baked nor be over-baked.

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Poultry Raising--III.

THERE are in vogue two different methods of hatching eggs. But there is no difference between hen-hatched and incubator-hatched chicks. Indeed the two methods may be combined with advantage. The primary condition is that only hatchable eggs should be procured otherwise success cannot be achieved.

In adopting natural incubation only hens that are distinctly broody should be allowed to sit on eggs. Now when a hen desires to sit a fever comes over her and her blood becomes heated. This is known as broodiness. Thin, unhealthy diseased hens, should not be allowed to sit. Great care must be taken so that the operations may not result in failures.

Suitable nests must be provided either on the ground or in wooden boxes. The nests should be free from the attack of rats and insects. The broody hens must be properly looked after and the most successful amongst them amply cared for.

The eggs to be hatched must be at first tested for fertility. They must possess a firm shell. Soft shelled eggs are spoiled. A diet of maize should be prescribed for the sitting hens and dust bath casually administered.

The chicks generally come out on the 21st day though in some cases they appear a day earlier. In order to make it easy for the chicks to pierce the shell and come out, it may be softened with vinegar. This may be applied on the eggs on the 18th or 19th day with moistened finger tips.

ARTIFICIAL.

Generally speaking there are two types of incubators—hot air and hot water. Now-a-days such good apparatuses are available in the market that the hatching of eggs has been rendered mechanical. Moreover a valuable course of instruction is often furnished by the makers themselves.

The temperatures inside the incubator and the incubator house must be run in conjunction. The temperature within the apparatus should be near about 100 degrees. The empty incubator must first be slowly heated up to a degree less than the required temperature and then the eggs placed inside. Too much heat will spoil all the eggs. It should on no account go over 103°. The degree of heat will be registered by the thermometer provided for the purpose. The egg drawer must not be crowded nor fresh eggs introduced at random. The full period of incubation must be allowed to one set of eggs without interruption.

The eggs are to be turned for the first time after 36 hours. After that they should be turned twice daily to make provision for sufficient cooling. But this is necessary only up to the 18th day and not more.

The eggs should be carefully tested after a week and again after another week. All unfertile and added eggs should be removed.

After the eggs are hatched any of the several methods of rearing chickens may be adopted. They may be reared either by natural means or by artificial means. Obviously enough natural incubation should be followed by natural rearing and artificial incubation by artificial rearing. For the former purpose the young chicks may be entrusted either to hens or foster mothers and for the latter purpose they may be quartered in a fireless brooder or placed in a heated brooder house.

Much depends on the care of the infant chicks. Indeed rearing young stock is the most difficult operation. They must be gently handled and judiciously fed. They should neither be under-fed nor over-fed. Moreover the food must give them proper nourishment. The chicks usually learn to eat as soon as they are able to stand. They may then be fed at frequent intervals but little at a time. The first should be given on the third day of their birth and must consist of easily digestible soft food. Bread crumbs moistened with milk, cracked wheat and corn, etc. may constitute the first few meals. Then gradually a greater variety may be introduced consisting of green vegetable, clovers and other grasses and the like They may be provided with plenty of grit and a little powdered charcoal may be occasionally added. The number of feeding should be reduced as the chicks grow allowing only 3 meals after a fortnight.

The common maladies from which chickens are apt to suffer are colds, cramp, diarrhoea, gapes, leg-weakness, parasites etc. When an ailment occurs steps should be taken to accord them proper treatment.

In case of epidemic diseases such as pox, cholera, etc. of larger birds the afflicted ones should be separated as speedily as possible so that the healthy ones may not be infected.

Cement Concrete—I.

CEMENT concrete is an artificial composite mass of sand and aggregate (although strictly speaking the term aggregate includes sand) bound together by the adhesive agent, cement and the whole being thoroughly mixed with water so as to form a sort of close conglomerate without any voids. The proportion of each constituent present depend on the ultimate use of the concrete. The aggregate is generally composed of any hard material that can be procured near at hand or in the most economical manner. Almost any hard substance may be used when broken up, such as broken brick, stone fragments, gravel, granite chips, hard clinker, burnt clay, coke breeze and shingle. Of these, probably gravel and stone are the substances that are most commonly used, as they are usually obtained locally at a small expense of labour. The following are some of the important points to be noted when choosing the proper forms of aggregate and sand.

SELECTION OF AGGREGATE AND SAND.

The aggregate should be hard, free from dust, angular, preferably of somewhat porous nature and of convenient size. The sand should be perfectly clean and free from clay or other impurities which would prevent the current from adhering to it. The grain should be rough, sharp, and angular and the sand should be the coarsest available. Sand containing salts is unsuitable for concrete, as by attracting moisture it is apt to cause damp and efflorescence. The aggregate and sand should be graded from the largest size chosen to the finest sand, and in this way a compact mass without any voids is obtained on the mixing of constituents, the cement merely acting as an adhesive agent, by reason of the fact that when wetted and allowed to set, crystallization takes place and the whole mass becomes solid.

PROPORTIONS.

Before the mixing of ingredients, the proportions of cement, sand and aggregate should theoretically be determined, either by weight, or by measure in loose condition ; but in practice the proportion of each is determined by custom, rule of thumb, or experience. The proportions of the constituents chiefly vary with the different uses of the concrete. But the *essential* requisite is that all the voids, between the particles of sand and aggregate, should be filled with cement mortar. Hence unless the grading of the sizes, of sand and of aggregate, is known or assumed, the bare statement of proportions of cement, sand and aggregate in a mixture, gives but little useful information as to the value of the concrete.

MIXING.

There are, in practice, *two* definite methods employed in mixing concrete namely—the *dry method* and the *wet method*. Of the two, the former is generally preferred. The dry method consists in mixing the cement and dry with the aggregate, not upon the bare ground but upon a clean timber, brick or stone platform. The materials are measured out by boxes made of sizes to suit the relative proportions of the ingredients decided upon. The measured materials are then heaped up together and turned with shovels until the mixture is of uniform colour, and each sand grain is coated with cement. The dry mixture should then be sprinkled from a watering can with a *rose*, no more water being used than is necessary to mix the whole thoroughly. If too much of water is added, it is apt to wash the cement away. The mixture should again be turned over so as to be most thoroughly incorporated.

The wet method consists in first preparing the cement mortar separately, and then adding to it the aggregate in a moist state. The cement mortar may be mixed under a stone revolving-on-edge or in mortar mixers, so that the cement and sand should be thoroughly and intimately amalgamated. The aggregate should be wetted completely before mixing with cement mortar, so that it may not suck up moisture out of mortar. The mixture of mortar and aggregate should be now thoroughly turned over in concrete mixers or with *rakes and hoes*, so that the ingredients may be thoroughly amalgamated.

LAYING.

The best concrete may be rendered almost worthless by carelessness or improper method in the laying. Concrete should never be dumped from a considerable height as this causes the separation of the heavy and light portions in falling and results in a concrete which is not uniform throughout its mass. The concrete should after thorough mixing, be immediately wheeled to the place where it is to be laid, gently tipped into position and carefully and incessantly rammed in layers of 6 to 12 inches in thickness. It is necessary that the layers should be horizontal to prevent the water trickling off and carrying away some cement with it. Each layer should be allowed to set separately, before another layer is put upon it. Each layer after it is perfectly set, should have its surface swept clean, roughened by means of a pick, washed and covered with a fine coating of cement. This is specially necessary if it has been rammed, for, in that case, the finer stuff in the concrete settles itself to the top, and also a thin milky exudation, which will, unless removed, prevent the next layer from adhering. The joints between the consecutive layers need special attention, otherwise, like veins in rocks, the mass can easily be split with wedges. When there is no time to allow such layer to set thoroughly before concreting is continued, it is better to ram it as quickly as possible than disturbing it by ramming after it has commenced to set, and, before it is set, it is better to add the layers above it. Concrete made from a quick-setting cement should therefore not be rammed at all.

When concrete has to be laid *under water* care must be taken that it is protected during its passage down to the site of deposit, so that the water may not reach it until it is laid. This protection is afforded sometimes by boxes of wood or plate iron, or by skids which can be opened from above, when they have reached the spot where the concrete is to be deposited so as to leave it there. These boxes are so arranged that, on reaching the bottom, a pin may be drawn out by a cord reaching to the surface, thus permitting one of the sloping sides to swing open below, and allow the concrete to fall. The boxes are then raised to be refilled. The area upon which the concrete is deposited must previously be surrounded by some kind of inclosure, to prevent the concrete from spreading beyond its proper limits; and to serve as a mould to give it its intended shape. This inclosure must be so strong that its sides may not be bulged outward by the weight of concrete. It is usually a close cril of timber or plate iron without a bottom ; and will remain after the work is done Bags partly filled with concrete and merely thrown down into water, are used in certain cases. Such bags may be rammed to some extent. Concrete is also made into large blocks, and these are allowed to set on shore, and afterwards carried out and deposited at the site. Large blocks of concrete have been prepared to the extent of 700 tons and upwards and deposited in *situ* in many of the harbour works.

(*To be continued.*)

—By Mr. R. K. Mirchandani.

Possibilities of Indore.

General.

INDORE State lies principally in the Central India tracts known as Malwa and Nimar and consists of several large blocks of territory, with a total area of about 10,000 square miles. Generally speaking it is bounded on the north by the Udaipur State, on the north-east by Jhalawar, on the east by the States of Gwalior, Dewas, Dhar, on the south by the Khandesh District of the Bombay Presidency, on the west by Gwalior and Barwani and on the south-east by Bhopal.

Portions of the State fall in all the three natural divisions of Central India viz, the Plateau, Hilly and the Low-lying tract.

The soil is extremely fertile, being mainly of the black cotton variety, growing a considerable amount of poppy. The uncultivated tracts afford excellent grazing land. Forests, strictly speaking, are not met with in this area. The Malwa peasants are a hardworking class of agriculturist, skilled in dealing with the cultivation of the delicate poppy plant.

The great escarpment which forms the southern boundary of the plateau determines the drainage of the country, all important streams except the Narbada flowing from the Vindhyas towards the Ganges-Jumna *doab.*

Soil.

The two general divisions of soil are *maletru* or dry and *piyat* or irrigated land Besides these the cultivator divides the soil into three broad classes, depending on its conformation, situation and the use to which it is put.

Classified by use the main divisions are shialu, shalu (or kharif) land, which bears crops sown in the autumn, and unhalu or *rabi* , which bears spring crops, other divisions are *salgatta* or low-lying rice bearing land, *charnoi* grazing land, *odan* manured and irrigated, usually garden land *bagh* or amrai grove and fruit bearing.

Agriculture.

The *kharif* crops require a comparatively high temperature and a plentiful supply of water, all the more hardy and cheaper food grains being then sown as *jowar, maize, bajra, kodon,* sawan and the pulses while the *rabi* crops require cool water and a moderate supply of moisture and consist of wheat, barley, grain and poppy.

Double cropping or *dufasli* is general on all irrigated land and is also practised in unirrigated and unmanured lands when the soil is very retentive of moisture.

Rotation of crops is common in land suitable for both *rabi* and *kharif* crops. The manure in ordinary use are the dung of cattle and village sweepings, The implements used are few and of the simplest kind.

The principal crops are—Jowar, wheat, cotton, gram, bajra, maize, sesamum, linseed, rice, sugarcane, mung, poppy, kodon, batla, tobacco, urad, etc.

Irrigation is of two kinds from wells or *o his* (wells constructed on the bank of a stream and fed by its waters) and by channels from tanks.

Forest.

The forest wealth of Indore State consists mainly of teak which has always been considered a royal tree. The other valuable trees are Acacia Catechu, the Myrobalans, Ebony, etc.

Under a new scheme of afforestation planting and sowing are being carried out.

Minor products of forest comprise bamboos dyeing and tanning barks, gums, mohua. Lac is not uncommon, being propagated on dhak trees. Al dye was formerly largely extracted. The *salai* tree produces a kind of gum incense (olibanum) in great abundance. An essential oil is distilled from lemon grass but not much (Andropogen).

A large number of edible fruits are available such as blackberry, custard apple, woodapple, etc tamarind, etc.

Honey and wax are clollected in large quantities by the tribes people

MINERALS.

The major of the State lies in the unmetaliferous Deccan trap area. However, aluminium in the form of *bauxite* is said to exist in large quantities in the laterite area. The other metaliferous deposit of value are the rich haematities (iron ores) met with in the sand-stone outcrop near Barwaha. Iron industry was once in a very flourishing state. A considerable industry in inlaid metal work, silver on steel, etc , formerly existed at Rampusa. Building stone of good quality is met with at several places. Basalt is found through the trap area, and is used in building to a certain extent.

INDUSTRIES.

There are no notable arts and industries in this State. The old indigenous Malwa arts, such as the manufacture of fine muslins, has entirely disappeared or only lingers in a condition of decay.

Cotton weaving is carried on in all large villages and coarse cloths and blankets are produced. At Maheshwar a small industry for the manufacture of coloured saris and dotijoras still exsists.

The only other important manufacture is that of opium.

TRADE

A very considerable trade in grain and opium is carried on with Bombay and other big centres in British India. The chief articles of import are piece-goods, salt, sugar, yarn, hardware, metals, oilman's stores, and kerosine oil. The chief exports are grain, *tilli*, cotton, opium, hides and bones

Each district has its recognised collecting and distributing centres which are fed by the weekly markets held in all villages of any size. The chief trade entrepots are Indore City Sanawad, Barwaha, Mhow, and Rampura. Trade is carried by road and rail, the roads being now chiefly used as feeders to the lines.

Ideas for Small Capitalists.

Mulberry Silk Industry.

Silk industry is one of the best cottage industries in India. There were days when India exported silk in great quantities. Now there is a great demand for silk in India and elsewhere. This industry being entirely a cottage one, and at the same time simple and inexpensive, can be easily carried on in spare time by women and children.

Silk is obtained from silk-worms which can be reared even in an ordinary village dwelling house in a corner. The potentiality of India for this industry is great as mulberry silk worms thrive best in a temperature of 65° to 75°F. and there is scarcely a place here where this temperature is not reached at some time or other during the year. Silk worms are of several kinds but the common varieties are "univoltine" or one-breeded race originally belonging to China and France, and the other 'multivoltine'' races generally cultivated in Mysore, Bengal and Kashmir. The former remains in egg state for 9 to 10 months and hatch only once a year while the latter hatches 4 or 5 times. Nistari worms of Bengal should be reared in summer (May and June) and the Mysore race from July to October. Much improvement can be made by cross breeding.

MULBERRY.

Mulberry, is the common name of the plant of the genus Morus of which there are two varieties Morus indica and morus alba. The silk worms rear on the leaves of this plant and derive the name from it. All varieties of white mulberry trees which produce male flowers and little or no fruit and yield leaves early in spring are the best food plants for all races of silk worms. The tree or bush can grow on any soil and in almost all climates. If manured they thrive well, cowdung or farmyard manure giving successful results. These can be grown on boundary lines or in back-yards and if space permits an acre, devoted for its cultivation will yield 300 mds. of leaves or on an average about 250 mds. may be produced every year. The plantation is of 3 kinds viz. bush, medium-sized and high system and is propagated by cuttings and graftings. Select fresh and mature stocks of mulberry trees are cut with a single stroke of a sharp knife 6 inches in length and planted in a slanting position in ploughed field in rows at distances of about 30 inches keeping 2 or 3 buds above the surface of the soil. Irrigation is not essential but if done more leaves will result. The first or bush system is expensive but very suitable for starting sericulture in a new locality as leaves can be plucked after about 2 and 5 years respectively. In the latter cases the leaves are more nutritious. So it is advisable to have both the cultivations simultaneously, a small plot serving for bush plantation. As the tree grows older the leaf becomes smaller and improves in quality. The plantation is carried out in the month of June or July, ploughing the field in February or March and May after a shower of rain for bush system and for high system in July or August ploughing in June or July. The probable expenditure for establishing a bigha of bush mulberry for the first 2 years will be about Rs. 100 and a recurring expense per annum will come to about Rs. 25 if the whole thing is got up by paid labour. Tree mulberry plantation is far cheaper than this. Mulberry leaves are sold at the rate of about annas 12 per maund of 82 lbs.

REARING.

APPLIANCES :—Before knowing the process of rearing, the appliances necessary for the purpose are the following. As already said this being a bye-industry the rearing is done in one of the rooms of the cultivator's dwelling either mud-walled or a *tatti* house being quite suitable if the space is neat, clean and well ventilated.

(i) BAMBOO FRAME OR STAND consisting of four vertical bamboo pieces with horizontal splits tied or nailed at distances of 1½ feet in the shape of a rack or Machan as it is called for the support of trays. To protect ants and rats climbing the posts, cones or inverted tin funnels are fixed at about 9 inches from the ground and a paste prepared by boiling a lb. of castor oil with a chattak of Dhuna or Dhup (gum resin *Shorea robusta*) for 10 minutes is applied occasionally up to this height.

(ii) TRAYS of split bamboos can be procured locally, round or rectangular 3 ft. by 2 ft. in size with the edge turned up forming a border of about 1½ ins. On these trays the worms are reared and can be had for about 3 annas each.

(iii) NETS of cotton yarn of different meshes, or the old pieces from the village fisherman's net will do to transfer the worms from one tray to another for clearing the refuse and faeces. The net is spread over the tray and fresh leaves are spread over it ; the worms crawl up and when all have done so the tray is cleaned.

(iv) SPINNING TRAYS OR CHANDRAKIS: On these mature and full-grown worms are kept for spinning. These are not so essential as mulberry branches or grasses can be used for the purpose. A *chandraki* is about 4 x 6 feet and costs only Rs 1-4.

(v) KNIVES, SICKLES AND BASKETS for chopping, cutting and collecting mulberry leaves and branches and also feather or jute brushes for handling the young worms are necessary.

The floor and walls of the room are cleanly rubbed with cowdung and all the appliances are washed in water, dried in the sun and kept in the rearing room. Then the openings are closed and sulphur fumes are kept by placing suphur dust on slow fire which will disinfect the room and the breeding appliances. Instead of sulphur the villager burns moist straw or mulberry stalks and tar in sufficient quantities.

EGGS :- When rearing worms, it shall be seen that sufficient leaf will be available for the catterpillars at all times. About 25 to 30 mds. of mulberry leaves are required for producing one maund of green (raw) cocoons. In the beginning it is better to buy eggs from Europe. French and Italian races should be reared in February and March. All the one-brooded races are not suitable for all climates, so cross-breeds breed best, hence *Boropolu* and *Nistari* are cross-bred with French or Italian races which are giving satisfactory results. One ounce of eggs is equal to 40,000 univoltine worms and 60,000 multivoltine worms and can easily be reared in a space of about 90 sq. feet which if properly looked after will yield one maund (82 lbs.) of green or raw cacoons worth Rs. 25 to 30. The eggs will hatch uniformly without application of artificial heat, when the temperature is between 65°-75°F. in 10 or 12 days' time. Care should be taken to see the eggs are disease-free.

FEEDING.

Feeding, as to the number, time and quantity of leaves generally puzzles many new rearers. Tender and soft leaves are given to the young worms and comparatively hard leaves to grown up ones. Clearing the bed daily is one system and the other is rearing on a bamboo machan without changing their bed from the time of hatching until maturity. In the first system there are 5 stages of feeding consisting of 6,5,7,6 and 9 days in each. The temperature of the rearing room under ideal conditions shall be between 65°-75°F. as the worms do not thrive well if the temperature is above 90° and below 60°; in the former case the growth is quick and in the latter case slow and non-uniform. In case some worms do not moult uniformly, they must be transferred by means of a net to a second tray to be fed therein. The principle of rearing and feeding is to rear little but well from 'healthy stock; feed small quantities but a number of times with fresh leaves. Fermented, muddy and dirty leaves should be avoided. The quantity of leaves to be served each time is determined by the appetite of the worms. In dry months the feed is little more. Food must be distributed uniformly all over the tray, the worms being too delicate to move about in search of food. Moulting worms should never be distributed and during this period the leaves given must be chopped small. In the fifth stage on the 7th or 8th day the worms stop feeding, shrink, diminish in size, pass soft faeces and become translucent as the stomach does not contain any leaf eaten by them and they begin to throw out silk filaments from their mouths. These are ripe or mature worms which are picked up and placed on the *chandraki* or other spinning medium. The *chandraki* is kept in a slanting position with the back to the sun for a day to hasten the spinning. It is then removed to a warm room. In four or five days the worms change into chrysalides within the cocoons. The cocoons are all collected, keeping the bad, soiled and double ones aside as they cannot be reeled. As already said 40 seers of green cocoons are obtained by 1 oz. of one-brooded eggs and 30 seers from many-brooded race. Soon afterwards within 5 or 6 days the cocoons have to be reeled,—this is not good and cannot be done—also or stifled, i. e., the moth inside the cocoons be killed by drying or steaming. Otherwise on the 10th or 11th day after spinning the pupae will change into moths and they will cut open one end of the cocoons and render them useless and thus 1,000 feet or filament will be lost for every cocoon. Cut and imperfect cocoons go as silk waste and fetch less price. Ordinary breeders can stifle the cocoons on a small scale by exposing them to the sun for about 4 or 5 days. Steaming is better and is done in different ways. But the best of all is by keeping the cocoons in cages of expanded matal of small meshes and kept in a wooden box the bottom of which is of thick iron plate. Four holes are kept on top to pass the vapour out and heat is applied from underside. They must reduce 1-3 in weight. Dry cocoons can be preserved for about a year by storing them in air-tight bags or tin boxes.

REELING.

The implements required for reeling are ; (1) Reel, or reeling maching as it is sometimes called, consisting of a broad wheel, the axis of which is fixed to a thick strong wood-stand at a height of the arm of a boy. It has handle and is turned by a boy or girl called the winder. In the front at a distance of 2 cubits is a frame made to stand vertically. The whole thing is made by the village carpenter and costs only Rs. 6 to 9. To this are fixed porcelain buttons (or agates) with very fine holes in the centre through which 5 or 6 filaments can pass ; pulleys and hooks for passing the thread easily to the reel ; and guider for winding the thread on the reel uniformly. (2) Boiling pan in which cocoons are boiled for reeling. (3) Reeling pan in which boiled cocoons are kept for reeling. (4) Perforated bronze spoon for transferring the cocoons from the boiling to the reeling pan. (5) Few small earthen pots for keeping water, unreelable parts of cocoons and dead pupae. (6) Charcoal stove or fire, waters, etc.

As the cocoons, are dried, to make filaments loose the first operation is steaming the dry cocoons on a water bath by keeping them in a basket and covering it with a gunny for half-an-hour. Secondly they are boiled to detach the gummy substance in contact with the cocoon. The temperature of water being 165° to 170° F for raw, 200° for half dried, 205° to 208° for full dried and 212°F for dried ones. Multivoltine or thin cocoons require less time than univoltine or thick ones. Water is boiled first, the cocoons are placed and turned with the spoon. Care should be taken to see that they are not over or under-boiled. In the latter the thread breaks and in the former knobs come out and the quantity and quality are both spoiled.

As soon as the cocoons are boiled they are removed to the reeling pan and the true filaments are got hold of smoothly and quickly. The beginner will really produce much waste but practice will make the reeler perfect. The water in the reeling pan is always kept at 150°-160°F by means of a small fire or charcoal stove and is occassionally changed when it becomes very turbid. In course of reeling many filaments break before the cocoons are exhausted, these are boiled again for a few minutes and the brush is then smoothly and gently used over them to catch the true ends.

4 to 6 filaments as the *"Denier"* requires are brought together and the thread is passed through the button hole above the upper wheel (1" in diameter), then taken down below the lower wheel of the same size and the required number of twists is given with the former part of the same thread. The villager twists only twice or thrice but nearly 100 twists give round and well-united thread on account of the friction, the thread emits a quantity of water and dries up quickly. Always the length of the twist should be between 7 and 8 inches. Then it is passed through hooks and the thread is finally tied on the reel. The button which should be of porcelain or agate, ½ inch in diameter, with a fine hole, is supported by a plate and hinge at a height of 3 to 5 inches from the water in the reeling pan, to give a play instead of breaking the thread when a knot or unreelable part comes in the course of reeling or the winder stops the reel suddenly.

The upper layer of all cocoons contains filaments of greater diameter than the lower lawer so that the diameter of the filaments of 4 or 5 thick cocoons is equal to the diameter of 6 or 7 thin cocoons. The number of revolutions of the reel should be 125 per minute for an expert and slower still for ordinary workers. As a filament is broken or the end is reached a new filament from a fresh cocoon is supplied. The quantity of thread in one skein should be about 7 tolas and not more. Re-reeling may or may not be done. There is a separate machine for the purpose and is done only for export. The villager is in the custom of twisting on the Dol.

The quality of raw silk is determined by the following :—

(1) Denier, (450 meters of thread weighing 0·05 grm—1 Denier). (2) Elasticity (3) Tenacity (4) Knobs and knots which should be as few as possible (5) Softness to the touch (6) Lustre (7) Colour (8) Twist (9) Moisture and (10) Quantity of gum.

From the following it will be seen that reeling is profitable and can be carried on with paid labour on a big or small scale. Only after gaining experience the large scale should be thought of.

Probable expenditure and receipts of 5 pans are at work.

		Rs.
House rent		5
5 reeling machines		75
Pay of 5 reelers for 1 month		75
,, 5 winders ,,		35
Fuel		25
Miscellaneous		15
Oil and sundries		3
38 mds. of cocoons at Rs. 25 a md.		950
Total— Rs.		1183
Price of 94 seers of reeled or raw silk at Rs. 14 per seer (2 lbs.)	1316	
Price of waste cocoons and ribbon waste at Rs. 2 per seer		38
Total—		1354

Profit 15½ per cent nearly.

For the cultivator who rears the cocoons the value of cocoons has to be deducted and instead Rs. 100 can be taken as the value of mulberry cultivation, leaving the price of land and interest on the capital; and another Rs. 100 for eggs and rearing.

There is also an improved foot-pedal reeling machine by which one man will be able to turn the reel by a pedal arrangement and reel at the same time. The reeling pan is kept on a table and costs only Rs. 20 including table, etc. and is the best for all beginners.

Models of the industry in different stages can be seen in the Indian Museum, Calcutta.

If doubts arise reference can be made to the author of these notes and information and advice within his reach will be gladly given as far as possible.

—By Mr. E. Lakkaraju Naidu.
"Chemo-House",
Malancha Road, Kharagpur.

Small Trades & Recipes.

Treating Sun Wrinkles.

Sun wrinkles—which arise from the screwing up of the eyes in a strong light—may easily become more or less permanent unless they are treated. When these seem to be getting accentuated they should be very gently rubbed with a little fresh sweet almond oil. An occasional application of the oil at bed-time on the lines at the corners of, and beneath, the eyes will keep away the wrinkles.

Cleaning Brass.

Amongst the many ways of cleaning brass and copper there is nothing, perhaps, so good and so entirely economical as the inside of a lemon skin. When the fruit of half a lemon is almost all used up, turn the skin inside out and spinkle it with salt ; then rub it over brass or copper work and polish with a dry cloth. The stains disappear as if by magic, and a brilliant surface is obtained.

To Clean Oily Bottles.

To clean an oily bottle introduce into it a quantity of fine sawdust or wheat bran, and shake well to cover the interior surface thoroughly ; let stand a few minutes and then add a quantity of cold water. If the bottle be then rotated in a horizontal position, it will usually be found clean after a single treatment. In the case of drying oils, especially when old, the bottles should be moistened inside with a little ether, and left standing a few hours before the introduction of sawdust. This method is claimed to be more rapid and convenient than the customary one of using strips of paper, soap solution, etc.

Artificial Ripening of Lemons.

As a result of investigation as to why the spent gases from kerosene stoves hastened lemon ripening it has been discovered that the ripening of green lemons is hastened by air containing ethylene gas. Concentration of 1 to 200,000 change the colour in 5 to 8 days and 1 to 2,000,000 was effective in 6 to 10 days. A dilution of 1 to 5,000,000 represented the greatest dilution which markedly influences rate of change of colour to yellow (which required about 14 days), while high concentrations apparently retard the change. Absence of oxygen also prevents coloration which temperatures between 57° and 82°C increases.

The effect is due to the fact that ethylene increased the rate of respiration. Industrial plants are in the course of construction to turn to commercial advantage this process of ripening lemons.

SCIENTIFIC & INDUSTRIAL TOPICS.

Metallic Foils by Electrolysis.

The first step in the new electrolytic method for the manufacture of silver and gold foil, consists in giving a glass plate to a cylinder made from highly polished aluminium a coating with a solution of guttapercha. When this film is thoroughly dry, a small quantity of copper powder is brushed over it, and then a thin film of silver may be electrolitically deposited on the same. The silver adheres tightly to the underlayer of copper. The silver layers is then highly polished and a coating of gold is formed thereon. In order to remove the coating that are formed in this manner, it is only necessary to dip the metal object in a solvent which has the power of dissolving guttapercha of rubber. According to this process, it is possible to obtain coating and films of gold on metallic objects, using only 0.005 to 0.008 gr. of gold per 100 sq. mm. of surface.

New Zinc-plating Process.

The Classen zinc plating process, invented in Germany, is designed especially for giving iron a glossy and adherent protective coating of great density. Sheet, tube, wire, screws, nails, and so on can be quickly covered, and the coating is stated to be perfectly smooth under a powerful microscope, while other zinc plating appears irregular and full of holes. On account of the porosity, other forms of plating have necessarily been thick. The smooth new plating resembles tin or silver, and is so much thinner than the old that equally as good protection is claimed from the use of only one-tenth to one-half as much zinc.

Evolution of Visualization.

Prof. Elliot Smith is wellknown as the brilliant protagonist of the theory that the cultivation of vision has been a very important factor in the evolution of man. When, long ago the distant ancestors of man became arboreal. they started on the way to pre-eminence. For the demands of arboreal life favoured cerebral variations in the direction of controlled agility, the seeing eye, and the understanding ear. There was an emancipation of the hand, a reduction of the snout, a bringing forward of the eyes, an enlargement of the brain case. There came about a great reduction o. the olfactory region of the brain and a progressive increase of the centres for sight, touch, hearing, and dexterous movements. Soon there was added the power of stereoscopic vision and the outgrowth of a prefrontal lobe of the brain which made delicate eye movements possible and a focussing of attention as well as of vision.

Grafting Vegetables.

Grafting, a procedure quite common in tree culture, has been applied to vegetables and flowers by a French botanist, who has by this method increased the size and yield of vegetables, created new species and prolonged the life of plants, and intensified the perfume of flowers. Such grafting operations have been performed on cabbage, lettuce, beans, potatoes, tomatoes and various flowers.

Print Paper from New Source.

German scientists claim to have solved the print paper problem in a novel way providing a comparatively cheap substitute for the world's diminishing supply of wood pulp. They have sought to utilise the most common plant such as reeds, rushes, flax, sugar cane, jute and bamboo, etc. already used in making the cellulose from which paper is manufactured. The actual manufacture of the paper required two hours only and is far cheaper than the wood pulp process. It is claimed that the price of the new paper will be 60 per cent less than the present price of wood pulp paper. Even card-boards are prepared by the new process. Despatches from Berlin say that more than 50,000 inner soles have been manufactured from these common plants.

Speed in Photographing Electricity.

The remarkable discovery that electrical disturbances lasting twenty billionths of a second can be made to record themselves on a photographic plate without light has been made by an American electrical engineer. Photographs made in such an infinitesimal time are most remarkable. To gain an idea of this almost unbelievable speed, it is only necessary to point out that light could travel around the earth seven times in one second, and in twenty billionths of a second it can travel only twenty feet. The instrument used to obtain these photographs is termed a Klydonograph. It consists of suitable plate holder for receiving ordinary photographic plates, and is provided with suitable electrical connections, so that electrical disturbances may be brought into contact with the sensitised side of the plate. When surges occur in the transmission line they photograph themselves. The surges may last two billionths of a second, or longer, so that the photographic plate must register them in that minute space of time.

Fruit Preserving with Rubber.

Rubber has more uses than to be turned into tyres, golf balls and dancing floors, and some of them are decidedly interesting. From Honolulu come tidings of its employment in fruit preserving. Fresh fruit is dipped in rubber latex, and the flavour and texture are preserved for many days. Strawberries so treated tasted good after a fourteen days' trip. Ripe mangoes and mangosteens have been sent all the way to Paris, where they arrived in perfect condition. Unripe bananas so treated ripened no further. The explanation is that a thin air-tight film is formed over the surface, which by excluding oxygen stops the physiological processes and no changes can take place until the film is removed. This bids fair to be an important discovery in the handling of tropical produce. Even the durian might be got to England with no diminution of its natural claims to attention.

FORMULAS, PROCESSES & ANSWER.

Sulphates of Copper, Iron and Quinine.

3025 H. H. Sarcar.—Asks how are sulphates of copper, iron and quinine are made ?

The sulphate of copper of commerce is obtained by roasting native sulphide of copper ; copper sulphur and iron sulphide are thus formed. The mass is then extracted with water, which dissolves the copper sulphate ; or it is heated with dilute sulphuric acid, in which the copper dissolves, while the iron sulphide remains behind. In either case the copper sulphate is obtained by evaporating the solution and allowing it to crystallise.

The crude sulphate of iron of commerce is prepared by exposing heaps of moistened iron pyrites or native bisulphuret of iron to the air for several months, either in its unprepared state or after it has been roasted. When decomposition is sufficiently advanced the newly formed salt is dissolved out with water and the solution crystallised by evaporation.

Chinchona bark, 1 lb , is mixed with milk of lime, made from 4 oz. of lime and 40 oz of water. After drying this mixture it is exhausted with strong methylated spirit (the strongest possible) and the slightly coloured solution neutralised with sulphuric acid. After filtering or subsiding, the clear liquid is distilled and the residue in the still dissolved in water, carefully neutralised, treated with charcoal and crystallised.

Concrete Protection for Steel.

3207 N. K. Mitra.—Asks why a cement coating over steel protects the metal ?

Steel alone is not very resistant to weather; and its surface must be protected. Concrete preserves the steel from deterioration and, in case of fire from expansion. A combination of steel and concrete is therefore capable of meeting the demands for structures which will resist both these stresses. It is subject to no form of deterioration which cannot be avoided by reasonable precautions. The cement coating is certainly immune from corrosion and decay.

To Give Copper a Durable Lustre.

3143 Mathuni Lal.—Asks how to ensure a durable lustre on copper.

Place the copper articles in a boiling solution of tartar and water for 15 minutes. Remove, rinse off with cold water, and dry.

Sticking Plaster.

3277 Gopal Singh.—Wants a recipe of sticking plaster.

First make two solutions, by dissolving (1) an ounce of isinglass in eight ounces of hot water ; and (2) two drs. of gum benzoin in two ozs of rectified spirits. Strain these solutions and mix them. Apply several coats of this mixture with a camel's hair brush to a piece of silk stretched on a frame. Allow each coat to dry before applying the next. The mixture can be kept fluid by a gentle heat. Finally apply a layer of a solution composed of one ounce of chian turpentine in two ounces of tincture of benzoin to the other side of the silk and allow to dry.

Peppermint Tablets.

3164 N. V. Gadre.—Requires some hints with a recipe for preparing peppermint tablets.

Take 8 parts of good white stearine and dissolve the same in 40 parts of alcohol by stirring. Next dissolve 3 parts of gelatine in 50 parts of hot water. Mix two solutions thoroughly and add 1000 parts of icing sugar. Rub the resulting pasty mass through a fine sieve, and dry by exposing to warm air. Sift again and add 3 parts of peppermint oil. Set aside the mass in close covered tin cans preferably for 24 hours to enable the peppermint to permeate thoroughly. Finally compress into tablets in the usual way with a tablet making machine.

To Preserve Orange.

3181 Suresh Chandra Nandi.—Asks how to preserve orange.

Oranges can be preserved only in a peeled state and pickled condition. The fruit is moistened and then blanched in a bright copper n with plenty of soft water. The operation will take from 2 to 2½ hours. After cooling in plenty of running water, the fruit is pricked and then placed in an 18° sugar solution, which is concentrated next day to 21°, and afterwards to 24°, at which stage the fruit is heated with the sugar. The concentration is increased to 36° and next day to 28°, the fruit being heated this time also. When cold it is packed with fresh sugar.

Chlorides of Mercury.

3254 Beant Singh.—Wants to prepare the chlorides of mercury.

(1) Mercuric chloride or corrosive sublimate. This compound is obtained by subliming a mixture of mercuric sulphate and common salt in a clay vessel on a sand bath with the addition of a small quantity of manganese dioxide. The sublimate collects in white crystals.

(2) Mercurous chloride or calomel. This compound is prepared by heating an intimate mixture of 4 parts of powdered mercuric chloride with 3 parts of mercury in a covered iron pan; the grey mass is heated until it becomes white and on then raising the temperature all the calomel sublimes on to the top of a plate which projects inside the pan. It is then poured into a vat of water and purified by repeated washing with dilute nitric acid to remove remaining traces of unaltered mercury, and is finally washed thoroughly several times with distilled water to eliminate the last traces of corrosive sublimate.

Great care should be taken in preparing mercury compounds as they are more or less poisonous.

Artificial Leather.

3179 P. A. Shet.—Asks how artificial leather is prepared.

Artificial leather is made from paper and certain cellulose derivatives, or from various kinds of fibrous materials coated with gelatine and heavily compressed. Sometimes leather scraps and trimmings are ground to shreds and soaked in gum or gelatine, and formed into boards by heavy pressure. These leatherettes are chiefly used for embossed trimmings in book-binding, and in places where pliability is not essential.

Uses of Felspar, Mica, Kaolin, Quartz etc.

2931 M. Das Gupta.—Wants to know the uses of felspar, mica, kaolin and quartz.

(1) The chief use of felspar in the industrial arts is for the manufacture of porcelain. Orthoclase is employed partly as a constituent of the body in certain wares, but principally as a glaze, Felspars rich in alkalies have been sometimes used as manures. Very pure felspars finds a limited application in the manufacture of artificial teeth. Several varieties of felspar are cut and polished as ornamental stones, the most important being labradorite, which is used for table-tops, umbrella handles, and various trivial objects.

(2) The chief application of garnet is as a gemstone, of which there are several beautiful varieties. Garnet is also used as an abrasive agent mainly in the form of sand, for sawing and grinding stone and for making garnet-paper, (often sold as emery paper).

(3) The uses of quartz are numerous. Many of the coloured varieties are employed in jewellery as semiprecious stones, for engraving, and for small ornaments of various kinds ; and also, to a certain extent as an ornamental stone in buildings. Balance weights, pivot supports, agate mortars, etc , are also cut in quartz. The "Brazilian pebble" of spectacles is clear rock crystal from Brazil and Madagascar. The same material is also cut into prisms, plates, and wedges for optical apparatus. As an abrasive agent quartz finds an extensive application in the form of grindstones, millstones, oilstones whetstones, sand-paper, scouring soap, polishing materials, sand blasts, etc. Ground quartz is also used as a wood filler in the manufacture of paints and in filters. Quartz and quartz sand are also largely used in building ; in making cements and mortar ; in the manufacture of glass and silica-glass, pottery and pottery glazes, ferrosilicon and corundum. It is also used to a certain extent as a flux in copper smelting. Blocks of quartz or quartzite are sometimes used for filling acid towers.

(4) Of the various micas, muscovite and phlogopite are the only ones of commercial importance ; and these go by the popular trade name of 'talc.' Muscovite was formerly called Muscovy glass owing to its use in Russia as a substitute for window glass. Nowadays it is employed chiefly as a transparent fire-resisting medium in the doors of stoves and furnaces, and for lamp-shades and gas covers. It is also used for the dial-plates of compasses. In

India it is applied to various ornamental purposes. Paintings on mica are well known is some countries. Sheets of mica have also been employed for decorative purposes.

(5) The term kaolin refers to any clays having the general characteristics of China clay. When washed China clay and the purer kaolins contain about 90 per cent of true clay. China clays and kaolins are used in the manufacture of porcelain and owe their name to the fact that they are the chief clay used in the manufacture of China ware. Still larger quantities are used in the manufacture of paper, and the very finest qualities are used for the manufacture of ultramarine. In the manufacture of earthenware, China clay gives an added whiteness to the body.

Making Mirrors.

3176 K. Suryaprakasa Iyer.—Wants recipe of silvering mirrors.

The composition on the backs of mirrors consists either of an amalgam of tinfoil and mercury or nitrate of silver deposited by means of other chemicals : either process is a difficult one for a beginner but may be worked successfully with due care. The following recipes will yield good result.

I.

(A)	Nitrate of silver	175 grains.
	Distilled water	10 oz.
(B)	Nitrate of ammonia	262 grains
	Distilled water	10 oz.
(C)	Pure caustic potash	1 oz.
	Distilled water	6 ,,
(D)	Pure sugar candy	½ oz.
	Distilled water	5 ,,

Dissolve and add tartaric acid, 50 grains. Boil in a flash for ten minutes, and. when cool. add sufficient distilled water to make up to 10 oz. For use, take equal parts of A and B. Mix also in another measure equal parts of C and D. Then mix both these mixtures together in the silvering vessel, and suspend the mirror face downwards in the solution.

II.

(A)	Pure nitrate of silver	10 grains
	Water	1 oz.

Add carefully, drop by drop, strong ammonia until the brown precipitate is redissolved, stirring meanwhile with a glass rod.

(B)	Pure crystallised rochelle salt	10 grains
	Water	10 oz.

When ready pour on sufficient to cover the glass, using two parts of A to one part of B. Let it stand in the sun for half an hour. Pour off the rest of the solutions, and wash gently with soft water and cotton-wool. The glass to be mirrored must be perfectly clean.

Treatment of Chicken Pox.

3025 H. H. Sarcar.—Please describe the symptoms and treatment of chicken pox.

Chicken pox is a disease of poultry which is frequent in hot climates. While this is contagious and will spread rapidly throughout an entire flock, it is not necessarily a serious trouble. It is usually caused by dampness or filth. It begins as a whitish brown excrescence generally near the base of the beak, and extends rapidly, becoming more yellowish as it does so. Scabby, yellow nodules or pimples appear on the face and comb, and frequently discharge a thick, yellow matter. It is manifestly contagious and isolation and disinfection are the first measures to be adopted. The sores of the sick birds should be anointed at once with carbolated noseline. Small doses of sulphur should be given internally, with tonic, such as iron or quinine. Allow simple nourishing, green food.

Principles of Distillation.

3340 Erachh Cheksey.—Writes, please describe in brief the principles of distillation.

Distillation is the process of vaporizing a liquid and recovering it by condensing the vapours. The liquid formed by this condensation is called distillate. Distillation is chiefly employed to separate a liquid from non-volatile matter dissolved or suspended in it ; or to separate one liquid from a mixture of liquids of different boiling points ; that one having the lowest boiling point being the first to begin to pass off as vapour.

But the separation of two liquids which are miscible with each other is never complete by this means, and is less perfect the nearer their boiling points are together. Liquids which are miscible in all proportions, may be tolerably well separated, provided there are a few degrees of difference in their boiling points, by employing the principle of fractional condensation of the vapours through a condenser which is kept at a constant temperature between the boiling points of the liquids. Thus the vapours of the high-boiling liquid being cooled below the boiling point of that liquid are condensed, while the vapours of the low-boiling liquid being still hotter than its boiling point, cannot condense, but pass on to another part of the apparatus, where they are condensed separately. When the high-boiling distillate condenses, it carries with it more or less of the low-boiling liquid and hence should usually be returned to the boiler and redistilled. In such mixtures as this, there is a gradual rise in the boiling point during the entire distillation.

Boiling Linseed Oil.

2985 Karamsing Gulhati & Co.—Wants to learn the process of boiling linseed oil.

The usual method of producing boiled linseed oil is by the addition to the raw oil of from four to eight per cent of concentrated liquid dryer, that is liquid solution of metallic salt. In practice, the boiling is performed by first thoroughly heating and agitating the raw oil to expel all moisture and then adding the previously heated dryer very slowly, agitating sufficiently to thoroughly mix the dryer through the oil. One mode of agitations for expelling moisture is, after heating the raw oil in the tank to 250 degrees, to pump the hot oil from the bottom out and into the top. The heating is usually done by hot steam coils within the boiling tank, and the best location for these coils is around the sides of the tank and not closer than ten inches to the bottom. The oil is maintained at a high heat for some time after the addition and thorough mixture of the dryer. The longer the temperature is maintained, the darker the oil becomes. The scum which forms on the surface, the residue left in the tank, and the scrapings from the filter cloths are disposed of separately.

Coconut Oil Shampoo.

3336 Zahoor Ahmad. Wants a recipe for coconut oil shampoo.

Coconut oil	4 dr.
Ammonia water 10 p. c.	5 dr.
Spirit of rosemary	1½ oz.
Eau de Cologne	1½ oz.
Tincture of Saffron	2 dr.

Mix the oil and ammonia, shaking well, and then add the other ingredients. Shake before use.

Preparation and Use of Ebonite.

3334 A. B. Rumthikar. Asks how ebonite is prepared and what its uses are.

When the proportion of sulphur mixed with India rubber (as required in vulcanising) is increased to 25 or 35 per cent. another product having qualities entirely different from those of vulcanised India-rubber is obtained when the mixture is heated. This is the jet-black substance termed *ebonite* or *vulcanite*, which is made into such articles as combs, paper-knives, buttons, canes, portions of ornamental furniture and plates of electrical machines. It is in many cases an excellent substitute for horn and for whalebone, while for insulating supports, etc., in electric apparatus, it is unrivalled. It has a full black colour and takes a bright polish ; and it may be cut, or filed, or moulded. It is very tough, hard, and durable. In the transformation of India-rubber into vulcanite, the temperature must be somewhat higher than that required for the production of vulcanised India-rubber. The India-rubber used is very carefully purified before it is incorporated with the sulphur ; and the yellow paste formed by the mixture is subjected to the contact of steam at a temperature of about 310.'

To Make Crayons.

3294 Ghafar Ahmad.—Wants some hints on making crayons.

Take three quarters of a pound of blue clay, three quarters of a pound of the colour desired, such as vermillion chrome, Prussian blue, orpiment, etc., 2 ounces of turpentine, 4 ounces of spirits of wine, and 6 ounces of fine shellac. The clay must be well mixsd with water passed through a fine lawn-sieve, and allowed to subside; the water is then poured off and the clay dried. The shellac must be dissolved in the mixed turpentine and spirit with a little warmth. The dry clay and the colouring must be blended in a mortar, and then the shellac mixture added and well incorporated till the whole is a

Apply to the Chief Agent and Consulting Match expert.

A. P. GHOSE,
M.S O I (Lon.

42, Benlapukur Road, Calcutta.

doughy mass ; it is then to be rolled out into a pencil form and dried with stove heat. To make the crayons of uniform substance, the paste may be placed in cylinder, with a hole at one end and a piston at the other. The pressed cylindrical pieces that pass through are then cut into proper lengths and dried.

Invisible Inks.

3156 Sultan Mohamed.—Wants recipes of invisible inks.

(1) The simplest invisible inks are onion juice and milk.

(2) Dissolve copper sulphate and sal-ammoniac in equal parts. The solution writes colourless, but turns yellow when heated.

(3) Solution of cobalt chloride turns green when heated, and disappears again on cooling.

(4) Solution of acetate of cobalt, to which a little nitre has been added, becomes rose coloured when heated, and disappears on cooling.

Analysis of Cereals, Vegetables & Fruits.

2807 K. Varatharajadu.—Requests us to show in tabular form analyses of foodstuffs such as cereals, pulses, vegetables and fruits.

	Refuse	Water	Fat	Crude fibre	Protein	Ash	Nitrogen free extract	Calories Per pound
VEGETABLES								
Potatoes	20 0	62.6	0.1	0.3	1.8	0.8	14.4	310
Onion	10 0	78.9	0.3	0.7	1.4	0.5	8 2	205
Cabbage	15 0	77.7	0.2	0.9	1.4	0 9	3.9	125
Tomatoe	—	94.3	0.4	0.6	0.9	0.5	3.3	105
FRUITS								
Apples	25 0	63.3	0.3	0.9	0.3	0.3	9.9	220
Oranges	27 0	63 4	0.1	—	0 6	0.4	8.5	170
Bananas	35.0	48 9	0 4	0.7	0 8	0.6	13 6	300
Grapes	25.0	58.0	1.2	3.1	1.0	0.4	11.3	335
NUTS								
Almond	45.0	2.7	30.2	1.1	11.5	1.1	8.4	1660
Coconut	48.8	7.2	25.9	—	2.9	0.9	14.3	1413

Composition of the principal cereal grains.

	Wheat	Barley	Rye	Rice	Corn	Millet
Water	13 65	13 77	15.06	13.11	13.13	11.66
Nitrogenous substances	12.35	11.14	11.52	7 85	9 85	9.25
Fat	1.75	2.16	1.79	0.88	4.62	3.50
Sugar	1.45	1.56	0.95	16.52	2 46	65.95
Gum and dextrin	2.38	1.70	4.86		3 38	
Starch	64.08	61.67	62 00		62.57	
Celullose	2.53	5.31	2.01	0.63	2 49	7.29
Ash	1.81	2.69	1.81	1.01	1.51	2.35

Analyses of pulses.

	Water	Albuminoids	Starch	Fat	Cellulose	Mineral Matter
Peas	14 3	22.4	51.3	2.5	6.5	3.0
Beans	14 0	23.0	52 3	2.3	5.5	2.9
Lentils	14.5	24.0	49.0	2.6	6.9	3.0
Groundnuts	7.5	24.5	11.7	50.0	4.5	1 8

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of INDUSTRY are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

[To communicate with the parties write with name and number under care of INDUSTRY when letters will be duly redirected.]

2941 K. N. B C, Rewari. Description of all kinds of tobacco used has been given. So you may try local tobacco dealers whether they they will be able to supply the particular variety of tobacco you require. Hindi equivalents of aniseed are saurif, saonf, somp and anisun.

2944 B. H, Gandevi. Handlooms may be supplied by B. D. Bery & Co., 43 Ripon Street and Bros Partner, 35 Ezra Street; both of Calcutta.

2945 I. W, Attungal. Your query being in the nature of an advertisement should not be treated in these columns.

2946 S. S. I., Trivandrum. Refer to No. 2945 above.

2947 A. C. L., Cochin. Recipe of rose water will be found in September 1924 issue. Process of deodorising coconut oil appeared in May 1924 issue.

2948 S. L. D., Ludhiana. Cardboard box making machines may be supplied by Vickers Ltd., Vickers House, Broadway London S. W. 1. The machine for pressing hosiery goods may be had of Oriental Machinery Supply Agency Ltd., 20-1, Lall Bazar Street, Calcutta.

2950 S. N. R., Gorokhpore. Seek legal advice.

2951 M. B. Pandit. For disposing of shellac you may try Bham & Co. 6, Pollock Street; Doncurrie & Co., 98, Clive Street and Laheri & Co., 93, Lower Chitpur Road; all of Calcutta. Shellac was quoted at Rs. 128 on 17th Feb. per md.

2952 K. Kylas. No such journal is available.

2953 A. K. Sen Gupta. Refer your enquiry to the Secretary, Khadi Pratisthan, 15, College Square, Calcutta.

2954 Ganga Ram & Sons You may write to Madan Theatres Ltd., 5, Dharamtola Street, Calcutta.

2955 Bishan Das. Inks are manufactured by Blackwood & Co. Ltd., 18, Bead Street, Hill, London E C. 4; M. Taylor & Co., 9, Northgate Street, Chester and Ayde & Co., 25 St Bride Street, Ludgate Circus, London E. C. 4.

2956 Ramesh Chandra Dutt. Process of washing golden laces appears elsewhere in this issue of INDUSTRY. For the other query write to the Irrigation Officer to the Government of Punjab, Lahore.

2957 K. L. Tarwall. The following are some of the timber merchants of India: Bombay Malabar Forest Produce Co. Ltd., Motilal Mansions, Humman Street, Fort, Bombay; Raicharan Biswas & Co., 65, Durmahatta New Road, Nimtollah, Calcutta; Mathuradas Tikamchand, Bikaner, Rajputana; Balthazar & Son, 66, Merchant Street, Rangoon Burma and Trading Co., Merchant Street, Rangoon, Burma.

2958 Gopal Dass Reja. Printing machines may be bought of John Dickinson & Co, Mercantile Bldgs., Lall Bazar; K. Banerjee, 133, Canning Street; Ashutosh Auddya & Co., 16, Lower Chitpur Road and A. Lall & Sons, 15, Balaram Bose's 2nd Lane, Puddapukur Road, Bhawanipur; all of Calcutta.

2959 J. N Bhan. Englishmen generally use hair lotion and hair shampoo in place of hair oils. We cannot say which is best. It depends upon individual taste. Formula of hair lotion will be found in the last September issue. Recipe of tooth powder appeared in June 1923 issue. Take ammonium nitrate 1 part and water 1 part ; pour the mixture to a vessel so that the mixture may be in contact with the vessel into which the water to be frozen is put.

2963 E P , Rampillai. Wants to be put in touch with dealers in gum camphor. You may apply the instrument polish to the picture frames. Shellac varnish is a kind of varnish in which shellac forms the main ingredient. Mastic and other ingredients may be had of S. N. De, Post Box 7851, Calcutta. One minute cameras may be had of A. Solomon & Co., 3, Kenderdine Lane, Calcutta. Musical instrument parts may be supplied by T. E. Bevan & Co. Ltd., Grosvenor House, Old Court House Street and Dwarkin & Son, 8, Dalhousie Square, East ; both of Calcutta.

2965 Jairama Sinai Quirtani. Marble stones may be supplied by Categari Gio, Batta V. Colombo 33, Genoa and Chini Societte Italiana, V. Olinette 5, Genoa ; both of Italy. For soda water bottles enquire of Hagge & Timmann, Rodings—markt 41 and Alfred Starkjohann, Breitestrasse 14 ; both of Hamburg, Germany.

2966 Das Talukdar Agency. Cream separators may be had of P. Lodge & Co., Post Box 6772, Calcutta.

2967 Vishram Nathu. For hair oil please go through Manufacture of Hair Oils published from this office. Recipe of peppermint lozenges will be found in November 1923 issue.

2968 N. J. Shukla. Scholarships on condition and free passages are granted by the Association for the Advancement of Scientific Education in Foreign Countries, 10, Old Post Office Street, Calcutta.

2969 R. P. Misra. Cash boxes are manufactured by Bysack Factory, 3, Brojo Dulal Street and Subol Factory, Prasanna Kumar Tagore Street ; both of Calcutta. Soap colours may be had of Amin Chand Mehra & Sons, 34, Armenian Street and Hansram Vishram, 13, David Joseph Lane ; both of Calcutta. Glass phials may be supplied by S K. De, 124, Sova Bazar Street, Calcutta and Satya Charan Paul, 194, Old Chinabazar Street, Calcutta. Cardboard boxes may be had of H. L. Sett & Sons, 8, Nilmoney Mitter Street, and Dass & Kundu, 20, Gour Laha Street ; both of Calcutta. You may go through September, 1923 issue of COMMERCIAL INDIA which deals with sugar trade. Coir mats may be had of Gopal Chandar Dass & Co., 74-1, Clive Street, Calcutta.

2970 H. P., Shroff. For glazing irons and other laundry requirements enquire of Pioneer Mail Supply Co., 93-3, Clive Street, Calcutta. You may also write to S. A. B. Bakshi & Co., 70, Calootola Street, Calcutta.

2971 Mangelal Sharma. Match splints and veneers may be supplied by Sunderban Match Works, 12, Dalhousie Square and Bhawani Engineering & Trading Co , 122-1, Upper Circular Road ; both of Calcutta.

2972 Zahur Bari. Mix 36 parts of carbon disulphide and 2, parts of rectified spirit. Now add into it small bits of rubber and allow it to remain undisturbed for a time. Rubber will be dissolved and turned into a fine clay like substance.

2973 Jinnot Ali Meah. Please enquire of any Kaviraj for 'Sonadana.'

2974 V. D., Bhargava. Process of solidifying mercury appeared in July 1923 issue.

Soap & Perfume Manufacturers.

FREE - Samples of perfumes for above trade will be sent on receipt of the inquiries from bona-fide manufacturers. Excellent qualities of the highest strength.

PRICES LOWEST.

Write for Samples to-day—

Anglo-Indian Drugs & Chemical Co.,
No. 155, Juma Musjid Circle.
P. O. Box No. 2082, Bombay.

2975 Ram Gopal Shah. Refer your query to Messrs J. F. Madan & Co. Ltd., 5, Dharamtala Street, Calcutta.

2977 Kamta Prasad Vidyarathi. There is no such machine available in the market; cream separators are used for making butter. These may be had of P. Lodge & Co., Post Box 6772, Calcutta.

2978 Purushotham. Tin box making machines may be supplied by Taylor and Challen, Birmingham and Alfred W. Staker, Ingrave House, 165, Fen Church Street, London E. C. 2. For printing blocks write to F. A. Günther & Sohn A. G., Berlin S. W. 11. Schonebergerstr 9-10, Germany.

2970 A. Kasapu Prabhulingam. Raw silk may be had of Dass and Talukdar, Gauhati, Assam.

2981 M. T. Rajan. Yes, fret-work will meet with fair demand by men of aesthetic culture; you may start that business. Fret-work of sandal woods are favourite of Indian aristocracy especially Indian chiefs and princes. Toys may be supplied by Bluming and Otto. Ritterstrasse 92, Berlin, Germany; Arthur Junker & Co., G. m. b. H., Winkelmannstrasse 3A-24, Dresden, Germany and M. Armbruster & Co., Bergedorf, Hamburg, Germany.

2982 Nihal Chand Ram Krishna. It is not our practice to repeat the a formula in one volume.

2983 B. V. M. M. Kulshrestha. Match machines may be supplied by Bhawani Engineering & Trading Co., 122. Upper Circular Road and Bengal Small Industies Co, 91, Durga Charan Mitter Street; both of Calcutta. All other machines may be had of Burn & Co, 7, Hastings Street, Calcutta. It will be profitable in the long run to use oil engines. Oil engines may be supplied by Marshall Sons & Co. Ltd., 99, Clive Street, Calcutta and Heatly & Gresham, 6, Waterloo Street, Calcutta. German made lanterns may be bought of Sarat Chandra Dass, 198-199, Old Chinabazar Street, Calcutta and Nihal Chand Ram Krishan, Fazilka, Punjab Toys may be supplied by K. B. Nan 233, Old Chinabazar Street and Pionee Toy Mart, 234, Old Chinabazar Street; both of Calcutta. American made lanterns may be supplied by Elliot & Co., 6A, Clive Row, Calcutta. Cycle accessories may be had of P. M. Bhattacharjee, 5, Dharamtola Street, Calcutta. Gramophones may also be supplied by the above firm. You may also write to K. C. Dey & Sons, 96, Lower Chitpur Road, Calcutta. For hats of all descriptions write to K. Edulji & Sons, 5, Dharamtala Street and Hall & Anderson Ltd, 31, Chowringhee Road; both of Calcutta. For buttons enquire of S. A. Khalique & Co., 4, Colootola Street, Calcutta. Swadeshi buttons are manufactured by Narayangunge Button Manufacturing Co, Narayangunge, Dacca; Oriental Horn Button Factory, Faridabad, Dacca and Calcutta Industry Ltd., 71, Canning Street, Calcutta. You may buy a Remington typewriter machine. For Kerosene oil write to Asialic Petroleum Co. Ltd.. 9-4, Clive Street, Calcutta. For salt refer to C. D. Rae & Co., 6, Old Post Office Street, Calcutta and Sheriff Danji & Co., 9, Zakariah Street, Calcutta.

2985 Dum Dumji & Co. To dispose of your goods advertise in the pages of newspapers and periodicals.

2986 Sant Prasad Lal. Your queries have already been replied.

2987 Premchand Ramchand Dalal. To communicate with any querist write him with number and initials under care of INDUSTRY when your letters will be duly redirected. Wants to be put in touch with biri dealers of Burma.

SETT DEY & Co.

ORIGINAL HOMEO PHARMACISTS
42, Strand Road, Calcutta.
Dealers in Original Homoeopathic dilutions
and Biochemic Triturations.
Catalogue Free on Application.

2988 M. J. Kardaley. A good number of recipes of inks will be found in November 1922 issue. A good recipe of tooth powder appeared in June 1922 issue. John Faber pencils are imported by J. F. Kellner & Co., Chowringhee, Calcutta. Papers of all descriptions are imported by Ghosh Brothers, 63J, Radhabazar Street, Calcutta and John Dickinson & Co.. Mercantile Blds., Lall Bazar, Calcutta. German novelties are imported by Singh Sarkar & Co., 125, Harrison Road and Laurel Novelty Co., Park Street ; both of Calcutta. For Liptons tea write to Hajee Ahmed & Sons, G 24 & 25, Municipal Market, Corporation Street, Calcutta. For cigarettes enquire of Karim Bux & Elahie Bux Bros , 58-4, Canning Street, Calcutta. Sunlight soap is imported by M. Framrose & Co., 9, Bank Street, Fort, Bombay. Fountain pens are imported by Nilmoney Halder & Sons, 106, Radhabazar Street, Calcutta. For ropes write to Ganges Rope Co. Ltd., 2, Clive Ghat Street, Cal; Calcutta Soap Works, 15, College Square, Calcutta is perhaps one of the biggest soap factories in India. Swedish matches may be had of Lalchand Brothers, Match Depot, 33A, Central Avenue, Calcutta and Japanese matches are imported by H. Rashid & Co., 15, Zakariah Street, Calcutta. All the other addresses required by you will be found elsewhere in these columns and in the advertising pages of INDUSTRY.

QUITE FREE.

Sample and Price List
of the most popular
Monkey Brand Black
TOOTH POWDER
FOR ALL DENTAL
DISEASES.

Apply to—
NOGI & CO.,
BOMBAY NO. 4.

2990 Osman & Sons. If you go through the 1st and 2nd volumes of COMMERCIAL INDIA you will get some hints on mail order business.

2991 Sundari Lal & Co. Chemicals you require may be bought of R. P. Wagle & Co., Bunder Road, Karachi.

2992 E. Ghulam Muhiadeen Sahil. Further details of manufacturing calcium citrate will appear in an early issue of INDUSTRY. Messrs B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta may take the calcium citrate manufactured by you. For chemicals required you may write to the above firm. We cannot help if the advertisers do not respond to your letter.

2993 J. M. Thomas. For directories required please write to Messrs Thacker Spink & Co , 3, Esplanade East, Calcutta.

2994 K. V. S. V. Pillai. For the books you require write to Messrs Chakravertty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

2995 P. R. Satyavagiswar. Refer your query to the Society of Oriental Art, Samavaya Mansion, Calcutta and to the Asiatic Society of Bengal, 1, Park Street, Calcutta.

2996 C. S. Subramanvagunikkal. For the required instrument write to Bengal Scientific Supplies Co., 31-32, College Street Market, Calcutta.

2997 Ramdas Jamnadas. A recipe of good varnish will be found in November 1923 issue of INDUSTRY.

2998 C. Venkata Sashia Karum. We hope you have got the November issue by this time.

2999 Mulk Raj Marwaha. Seek medical advice.

3000 Rameshwar Prasad. Dyes and colours may be supplied by Amin Chand Mehra & Sons, 34, Armenian Street, Calcutta. After preparing the ink, strain through some linen. Formula of fountain pen ink appeared in August 1924 issue. Logwood is known as *Bakam Kastha* in Bengal.

3001 No Name. Bucket making machineries are supplied by Daniel Smith Ltd., Castle Iron Works, Peel Street and Raglan Street, Wolverhamton, England.

3002 M. A Balasubramian. You may write to Imperial Tobacco Co. Ltd. National Bank Bldg, Clive Street, Calcutta.

3003 Baldeo Prasad Jhauri Lal. For the machines required you may write to Carl Kaelble, Backnang, near Stuffgart and Willy Weingerten & Co., Werkerg Weirznerstasse 10, Leipzig; both of Germany.

3005 S V. Narasimha Rao. Your query is not in our line.

3006 C. T. Jajal. Wants to buy an A. B. C. Bentley's code book.

3008 M. S. Bhandari. It was subsequently found that the idea referred to by you was not workable.

3010 Mahendra Nath Singh. You will not be able to start a soap factory with less than Rs. 1000. Soap stamping apparatuses may be supplied by Calcutta Industries Ltd., 71, Canning Street, Calcutta. Soap colours and scents may be had of Sikri & Co., 58-4, Canning Street, Calcutta.

3011 Jewanlal & Sons. To dispose of your butter advertise in the pages of newspapers and periodicals.

3013 Gobind Das Suri. To secure agency please go through Sale and Exchange pages of Industry. Addresses of foreign periodicals appeared several times in these columns.

3015 Dr. Arjun Singh & Sons. For registration of medicine write to 5, Esplanade West, Calcutta. For particulars write direct to the advertiser.

3016 S. A. Karai. You may consult 'Surma' a weekly in Bengali published at Silchar, Assam and 'Paridarsaka' published at Sylhet, Assam You may write to Imperial Agricultural Research Institute and College, Pusa, Bihar. Wants to be put in touch with garlic merchants.

3017 S. Sundar Rao. Desires to buy "time-stamping" machines.

3019 B K. Kirtane. For books on cottage industry write to Chakravertty Chatterjee & Co Ltd. 15, College Square, Calcutta.

3022 H. M. Dev & Co. For the addresses write direct to the advertiser.

3024 S. N Banerjee. No book on Marbling paper is known. Most probably ox-gall cannot be replaced. by any other substitute. For plough try Messrs Kirlosker Bros., Kirloskerwadi, Bombay.

3026 S. A. Akhtar. Your query is not in our line.

3028 Jan Mohamed. For the machines require write to Oriental Machinery Supply Agency Ltd, 20-1, Lall Bazar Street, Calcutta.

3029 Jagat Mohan Roy. You may write to the Librarian, Commercial Library, 1, Council House Street, Calcutta, Other queries have already been replied.

3030 Shahzade Singh. An article on condensed milk appeared in November, 1920 issue.

3031 C. B Godhi. For oil mills write to Burn & Co., 7, Hastings Street, Calcutta.

3032 United Provincial Company. Rice hullers are manufactured by Ghatak & Co., Rai Bahadur Road, Behala, Calcutta.

3033 B. Saran Recipe of chewing tobacco will be found in the November issue. Glass phials may be supplied by S. K. De, 124, Shova Bazar Street and Calcutta Glass & Silicate Works, 101, Cornwallis Street; both of Calcutta

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A SURE REMEDY
SHINDE BROS.,
AGUE MIXTURE
FOR
ALL MALARIAL FEVERS.
AGENTS WANTED EVERYWHERE
Special Terms to Merchants.
Apply to—
Shinde Brothers.
Shinde Bldg. De Lisle Road, Bombay 11.

3034 Radha Mohan Sarkar. Process of preparing tobacco for *hookah* appeared in October 1924 issue.

3035 Orient Import & Export Co. Gold and silver thread may be had of Amitava Ghosh, 133, Canning Street, Calcutta ; Gopaljee Chapsi & Co., 303, Hornby Road, Fort Bombay and M. A. Ahmed Batcha Sait & Co. 16-17, Second Line Beach, Madras. For towels write to A. K Hajee Ganny, 33C, Merchant Street, Rangoon ; Senda & Co., 63, Merchant Street, Rangoon ; Chamanlal Sarabhai Javeri, 311, Shroff Bazar, Bombay and Goculdas Damodar & Co., Dharamraj Gulli, Mulji Jetha Cloth Market, Bombay Paper may be bought of Ghosh Brothers, 63J, Radhabazar Street, Calcutta and Cama Norton & Co., Hamji Street, Elphinstone Circle, Fort Bombay, Hosiery goods may be supplied by E. B. Bros. & Co., 11, Dharamtola Street, Calcutta and Ahmed Ismail Patel & Co., 116-118, Chakla Street, Bombay. Fancy goods may be supplied by Laurel Novelty, Park Street, Calcutta ; K. B. Nan, 233, Old China Bazar Street, Calcutta ; Ganapathy & Co.. Khetwadi Post, Bombay and Addison Tranji & Sons, 4, Bruce Lane, Bombay.

3036 K N. Chandramouli. Envelope making machines may be supplied by Oriental Machinery Supply Agency Ltd., 20-1, Lall Bazar Street, Calcutta.

3037 S. V. Satyanarayan Row. For starting small industries please go through September 1923 issue of INDUSTRY. To sell bones you may write to Bengal Bone Mills, 8, Old Court House Corner, Calcutta and Kurrimbhoy Bone Mills, Mazagaon, Bombay.

3040 Dr. Phool Chand. Formulas of hair dye appeared in the last January issue.

3041 S. Varodasah. Kerosene oil is a natural product and is obtained in mines. For other queries seek legal advice.

3042 A. C. Chervery. Caustic soda may be had of Chettle Holt & Ltd., 9-10, Moore Street, G. T. Madras. Soap colours and perfumes may be had of Sikri & Co., 54-8, Canning Street, Calcutta. Glass phials may be bought of Satya Charan Paul, 194, Old China Bazar Street, Calcutta. Soap moulds may be bought of Eastern Engineering Works, 22A, Shambazar Bridge Road, Calcutta.

3043 K. Syed Sulaiman. An article on Calico printing appeared in December 1922 issue. A recipe of pain killer also appeared in the same issue. An article on vaseline manufacture will be found in December 1921 issue.

3044 Raghunandan Sharma, Yarns of all descriptions may be bought of E. B. Bros. & Co., 11, Dharamtala Street. Calcutta and East & West Trading Co., 16, Bonfield's Lane, Calcutta.

3045 Maung Than. You may consult Henley's Twentieth Century Book of Recipes, Formulas and Processes, to be had of Business World Publishing House, Post Box 2084, Calcutta.

3048 Vartiddu Nagaraju. Recipes of matches will be found in September, 1923 issue of INDUSTRY.

3053 M. Ganesa Iyer. For medical books write to Butterworth & Co., Hastings Street, Calcutta.

3054 M. Abdul Hai. Chemicals you require may be bought of B. K. Paul & Co., 1-B, Bonfield's Lane, Calcutta.

3055 S. A., Inamdar. Now investment in shares and Govt. Securities is not very profitable. You may cultivate your land ; we think it will yield more profit.

Bombay Deshi Oushadhalaya.
Factory & Dispensary.
ASK FOR ANY FEVER
AGUE KILLER.
1 Phial as. 8. Doz. Rs. 5.
and our other popular remedies. Can be had everywhere at Cheapest Rate.
PEARL & CO., Victoria Garden,
BOMBAY.

3056 G. Nath Maloo. To communicate with any querist write him with number and initials under care of Industry when your letters will be duly redirected.

3057* Rattan Singh., Refer your query to the Director of Industries of your province.

3058 Kishori Lal. For tube wells write City Tube Well Co, Kuver Ltd; 84, Clive Street; and Bengal Chemical and Pharmaceutical Works Ltd, 15, College Street, both of Calcutta. For hardwares enquire of Anandji Haridas & Co, 20 Darmahatta Street and Jessop & Co., Ltd., 93, Clive Street; both of Calcutta. Stationery articles may be supplied by Nilmony Halder & Sons, 106, Radhabazar Street, Calcutta. German lanterns may be bought of Sarat Chandra Dass, 195-199, Old China Bazar Street, Calcutta. American lanterns may be had of Elliot & Co, 6-A, Clive Row, Calcutta. Glass bangles may be bought of F. P. Nalladaroo & Co., 50-1, Canning Street and Abdul Aziz 52, Canning Street; both of Calcutta.

3059 P. S Sundram. New openings requiring scientific knowledge are suggested in the columns of Industry month after month, so if you go through some copies of Industry you will be able to make out a plan for starting a business.

3060 Fedahussain Mulla Mussajee. The Book of Knowledge may be had of Standard Literature Co., 13-1, Old Court House Street, Calcutta. Other queries are not in our line, better seek medical advice.

3061 Basdeo Singh & Bros. For Stephen's ink write to Nilmony Haldar & Sons, 106, Radha Bazar Street, Calcutta. For ink pots of required design enquire of Parry & Co., 11, Clive Street, Calcutta. For unbreakable German slates enquire of Singh Sarkar & Co., 125, Harrison Road, Calcutta.

3064 V. G. Joshi. Thread balling machine may be had of Oriental Machinery Supply Agency Ltd, 20-1, Lall Bazar Street, Calcutta.

3065 Pushpadatta Prasad Jain. For photo materials write to Calcutta Camera House, Chowringhee, Calcutta.

3066 William Bros. You may write to Imperial Tobacco Co. Ltd., National Bank Bldgs., Clive Street, Calcutta and Karim Bux & Elahie Bux Bros, 58-4, Canning Street, Calcutta for cigarettes of required brand.

3068 Malayala Mantra Sala. Will any reader of Industry inform the address of the translator of Vrigu Sanhita into English?

3069 Uma Shankar Prasad. Any handy dictionary will give the full significance of the Abbreviations. Coconuts are largely found in the Malabar coast and dates are found in Arabia while black-peppers are found in Dutch East Indies. Camphor may be had of Bansidhar Dutt, 126, Khengraputty, Barabazar, Calcutta. German goods are imported by Singh Sarkar & Co., 125, Harrison Road and Laurel Novelty Co., Park Street, both of Calcutta.

3072 S J Gandevia. The quotation include cost, insurance, freight, etc but not customs duty.

3073 Tulsi Ramji. Formula of ink will be found in August 1924 issue; other queries are not in our line.

3076 Shaik Imam. Bottles and phials may be supplied by Satya Charan Paul & Sons, 194, Old China Bazar Street, Calcutta and S. K. Dey, 124, Shova Bazar Street, Calcutta. Tin

CHEAPEST HOUSE FOR
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Fine Silver Medals in Velvet lined cases.

Rs. 3-12 Each.
Largest Stock & Variety
Illustrated Lists Free.

Carr & Mahalanobis,
Chowringhee Corner, Calcutta.

boxes may be had of Gajanand Rampartap & Co , 6, Halsi Bagan Road, Calcutta.

3077 M. L. S. S. Setty. You may use naphthalene. For perfumery you may write to Asgar Ali Mohamad Ali, Chowk, Lucknow..

3078 Meeran Saheb & Sons. For pencils try H. C Kurz, Berlin S. W. Kochstrasse 5 and A. W. Faber, Berlin W. 8, Friedrichstrasse 79 ; both of Germany.

3079 S. Sethu Ram. You may correspond with the following commission agents of London :—(1) Andesson, Green & Co. Ltd., 5, Fenchurch Avenue E. C. 3 ; (2) Danzas & Co. Ltd., 16 & 18, Finsbury Street E. C. 4. and (3) Mertens & Co., 3, Crossla, E.C. 3.

3081 S. R. Gaikwod & Son. In making tablets you will have to use tablet making machines which may be bought of Calcutta Industries Ltd, 71, Canning Street, Calcutta. First of all make powder then add some adhesive such as gum arabic and put in the machine. The machine will turn out glazed tablets.

3082 H. E. Mudaliar. For looms write to Messrs Bros Partner, 35, Ezra Street, Calcutta.

3085 Namagiri Chandrasekharachary. Jewellers' tools may be supplied by A Paul & Co , 232A, Upper Chitpur Road, Baghbazar, Calcutta. For block making please go through an article on Process Blocks for printing that appeared in February 1923 issue.

3086 Rupchand Bapuji Patel. Guns may be supplied by Esoofally Mahamedally & Co., 78, Bhusari Moholla, Crawford Market, Bombay and K. C. Biswas & Co., 1, Chowringhee Road, Calcutta. Rice hullers may be had of Marshall Sons & Co., Ltd, 99, Clive Street and Ghatak & Co., Rai Bahadur Road, Behala ; both of Calcutta.

3087 Bishan Dass. You may consult Kelly's Directory to be had of Kelly's Directories Ltd., 182-184 High Holborn, London, W. C.

3088 Dr. Tek Chand Katar. Collapsible tubes may be supplied by Vanesta Ltd, Great Tower Street, London E. C. 2 and Brooks Peel & Co., Ltd, 24, City Road, London E. C. 1. For blocks write to Calcutta Phototype Co., 1, Crooked Lane, Calcutta.

3089 Kunj Lal Jain. Recipe of a good shaving soap will be found in September 1924 issue.

3090 Kashmiri Lal Darry. Sheet metal machines may be supplied by Taylor & Challen Ltd., Birmingham, England.

3091 Dumgarsi Hemraj. Kelly's World Directory will serve your purpose. See No. 3087 above.

3092 T. Sanjeeviah. For the machine required enquire of Oriental Machinery Supply Agency Ltd., 20-1, Lall Bazar Street, Calcutta.

3093 Satya Ram Kulsrastha. Glass phials may be had of Satya Charan Paul, 194, Old China Bazar Street and S. K. Dey, 124, Shovabazar Street ; both of Calcutta.

3094 D. P. Kaeper. For books on advertising write to Messrs Thacker Spink and Co., 3, Esplanade East and Kamala Book Depot Ltd , 15, College Square ; both of Calcutta. Your other query is not in our line. Please consult a physician.

3095 Singaram Pillai. Please refer your query to the Indian Match Manufacturers' Association, 122-1, Upper Circular Road, Calcutta.

3096 S. Abdul Rashid. For industrial books write to Chackravertty Chatterjee & Co. Ltd., 15, College Sq., Calcutta.

3098 Hanumanth. Refer your first query to Bombay Millowners' Association, 50, Graham's Bldgs., Parsi Bazar Street, Fort, Bombay. Yes, you may apply the same colour to tussar also. Magic lantern and slides may be supplied by K. B. Nan, 233, Old Chinabazar Street and Pioneer Toy Mart, 234, Old Chinabazar Street ; both of Calcutta. For other queries please go through December 1924 issue of INDUSTRY.

3099 Umacharan Singhal. Hectograph may be supplied by Messrs Thacker Spink & Co, 3, Esplanade East, Calcutta.

3100 K Gopinath Chowdhury. Soap moulds may be supplied by Eastern Engineering Works, 22A, Shambazar Bridge Road, Calcutta. Photo cameras may be had of Calcutta Camera House, Chowringhee, Calcutta.

3101 C. Nyden. To communicate with any querist with number and initials under care of INDUSTRY when your letters will be duly redirected.

3102 Haris Chandra Sen. 'Yes, you may send your article and if found suitable for publication will be published in subsequent issue.

3103 Gobindram Chawla. Cinema machine may be bought of Madan Theatres Ltd., 5, Dharamtola Street, Calcutta. Cycles may be supplied by Manufacture Francaise D'Armes et Cycles De Saint-Etienne, 42, Rue du Louver, Paris, France.

3105 Nemi Chand. Piece-goods are supplied by Haji Moosa & Co., 267, Jackeria Masjid, Bombay ; Goculdas Damodar & Co., Dharamraj Gulli, Mulji Jetha Cloth Market, Bombay and Marsh Eyons & Co. Ltd., China House, 104, Bloom Street, Manchester and Alfred Young & Co. Ltd., 29, Rondla, London E. C. 3. Formulas of patent medicines are not known.

3106 Khitish Chandra Roy Chowdhury. Refer your query to the Secretary to the Revenue Department, Writers' Buildings, Calcutta. Your other query is not in our line.

3107 S. G. Johnston. Whiskey is generally extracted from malted barley. An article on the manufacture of boot polish appeared in June, 1924 issue. In the same issue you will find an article dealing with the process of manufacturing glass bangles.

3110 K. R., Bharsariah and Bros. Advertise in INDUSTRY in Sale and Exchange page for Kelly's Directory ; also Hindi-English dictionary.

3111 Patri Suryanarayana. For banian making machines write to Economic Mills Ltd., 50-2, Dharamtola Street, Calcutta.

3113 E. Maung Maung. Wants to be put in touch with dealers in barley and oats.

3114 Meghraj Niladhar. Jute and hemp may be bought of Madhulall Doogar & Son, Doogar House, 37, Canning Street and Giridharimull Ramlal Ganti, 10, Armenian Street, both of Calcutta. The above firms may also supply you hemp. Jute is mixed with wool as an adulterant

3121 D. Raghava Reddy. Picture post cards may be supplied by Lovenfosse & Co., Berlin S. W. 68, Lindenstraße 16-12 and Alfred Weinstein, Hamburg 11 ; both of Germany. Refer your query regarding mango tree to the Director of Agriculture, of your province. Other queries being in the nature of an advertisement should not be published in these columns.

3122 S. N. Mukerji Wants to be introduced to lock dealers of Africa.

3123 Islamia Book Depot. Recipes of good inks will be found in November 1922 issue. Formulas of hair dye appeared in the last January issue. Process of preparing chalk crayons appears elewhere in this issue.

3125 N. S. Ramasamy. Sodium bicarbonate is used for medicinal purposes while sodium carbonate is used for washing purposes; cream of tartar is bitartrate of potash while tartaric acid is obtained from argol or crude tartar. Biscuit moulds may be supplied by Eastern Engineering Works, 22A, Shambazar Bride Road, Calcutta. Recipes of biscuits appear elsewhere in this issue.

German Aniline Dyes, and Chemicals of the well-known manufacturers—
Messrs Leopold Cassella & Co.,
Largely consumed by big Industries, such as Jute, Silk, Cotton, Wool, Leather, Paper, Inks etc.
—STOCKISTS—
Messrs. Fazlehusein & Brother,
44, ARMENIAN STREET, CALCUTTA.

3126 C. C, Shah. Process of manufacturing washing soda, soda crystals and caustic soda from reh will appear soon. You may purify the China clay by washing.

3128 U. N. Banerjee. Rickshaws may be bought of Calcutta Rickshaws Ltd, 49A, Machua Bazar Street, Calcutta. Your other queries are not in our line.

3130 Dr. K. N. Murty Naidu. Formula of curry powder will be found in December 1920 issue. Recipe of jams appeared in August 1921 issue.

3132 H. M. Abdul Khaliq. An article on vaseline manufacture will be found in December 1921 issue.

3133 C. Nyden. You should advertise in the pages of newspaper and periodicals for the speedy sale of your goods. You may write to Banshidhar Dutt, 126, Khengraputy, Calcutta.

3135 Hajee Abdul Wahid. Fancy goods may be supplied by Hans Meyer & Co, Bremen, Germany; Schwarz Neubaus & Co. G. m. b. H., Nurnberg, Germany. Burmingham Novelty Co. Ltd, 28, Edgbaston Street, Birmingham, England; Lang Hugo & Co. Art Repositories Ltd., 50. Lord Street, Liverpool, England; American Art Works, Coshoctan Ohio, U. S. A. and Pacific Novelty Co, 41E, 11th Street, New York, U. S. A. For boots and shoes enquire of Shoemakers Ltd., London Mews, Maple Street, London W. 1; T. Robers & Sons, 439, Moongate Station Chambers, London E.C. 2; S. C. & E. Shoe Co, Columbus, Ohio, U. S. A. and Excelsior Shoe Co., Portsmouth, Ohio, U. S. A.

3136 S. R. Samson. Process of blueing gun-barrel appeared in the last January issue. In case of reblueing the same process is applicable.

3137 H. M. Gharmani. Cinema and other appliances for cinema exhibition may be supplied by J. F. Madan & Co., 5, Dharamtola Street, Calcutta. For the book on the subject try Messrs Thacker Spink & Co., 3, Esplanade East, Calcutta.

3138 Hajee Abdul Wahid. Calendars are manufactured by Henderson Lithographing Co, Cincinnati, Ohio, Stone Printing and Manufacturing Co., Roanoke, Virginia and American Art Works, Coshocton, Ohio; all of U. S. A.

3139 Maung Shevetun. All the ingredients you require may be had of Banshidhar Dutt & Co., 126, Khengraputty and Haldar Dutt & Co., 90-91, Monohar Das Street; both of Calcutta.

3140 K. Appu Rao. Recipe of pain balm appeared in December 1922 issue of INDUSTRY.

3141 S. Sita Ramayacharyulu. For printing machine write to K Bannerjea, 133, Canning Street and Ashutosh Auddy & Co., 16, Lower Chitpur Road; both of Calcutta,

3144 K. Satyanaraya Murthy. The following are the chemical dealers as required by you:—H. C. Mehta & Bros., Samuel Street. Vadgadi, Pragjee Dharamsee & Co., Vadgadi; Punjab National Trading Co., Vadgadi and V. K. Bros., 95, Samuel Street; all of Bombay.

3145 Kanaya Lal T. Tabrij. For brass fitting write to P. N. Ghosh & Co., 84, Clive Street and B. K. Chatterjee & Co., 13-1, Clive Row; all of Calcutta.

3146 C. Pushith. To prevent moistening use dry powdered sugar available in market. Your other process is all correct.

3148 Luxmi Narain. Match making machines may be bought of Bhawani Engineering & Trading Co., 122-1, Upper Circular Road and Bengal Small Industries Co, 91, Durga Charan Mitter Street; both of Calcutta.

3149 Khan Chand. Process of deodorising coconut oil appeared in April 1922 issue.

3150 M. A. Hafiz. Addresses of foreign journals will be found in September 1924 issue under No. 1710. in Brief Query columns.

3151 Chandra Narayan Sinha. For the machine required write to Indo-Swiss Trading Co., 27, Pollock Street, and Economic Mills Ltd., 50-2, Dharamtala Street ; both of Calcutta.

3154 Abdul Mobin. Process of manufacturing soap similar to sunlight soap appeared in August 1921 issue.

3155 No name. Yarns may be supplied by E. B. Bros. & Co., 11, Dharamtala, Street, Calcutta. Your other query has already been replied.

3158 P. L. Saha. Refer your enquiry regarding ferroprussiate papers and printings on them to Bengal Miscellany Ltd., 99, Manicktola Main Road, Calcutta.

3160 R. V. Naidu. Gum tragacanth may be supplied by B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta. For plaster of Paris try Calcutta Mineral Supply Agency, 31. Jackson Lane, Calcutta.

3162 Rameshwar Prosad. Coconut oil cannot be kept in liquid form without any other oil. All kinds of vegetable oils may be supplied by Panchkari Tat & Sons, 6, Mirhabar Ghat Street, Barabazar, Calcutta. Ingredients for ink powder may be bought of B. K. Paul & Co., 1-3, Bonfield's Lane and Calcutta Chemical Co. Ltd., Panditia Road, Ballygunge ; both of Calcutta.

3163 H. M. M. Manzur. Tablet making machines may be supplied by Calcutta Industries Ltd., 71, Canning Street, Calcutta.

3165 H. S. Azeez Uddin. Process of curing tobacco appeared in the last June issue. Tobacco cutting machines may be supplied by Oriental Machinery Supply Agency Ltd., 20-1, Lall Bazar Street, Calcutta. A good recipe of flavouring tobacco will be found in August 1922 issue.

3166 P. V. Sundaraja Iyengar. Refer to No. 3150 above.

3167 Jan Mahomed. Your queries have already been replied.

3168 T. Krishna Rao. For second hand printing machines write to A. Lall & Son, 15, Balaram Bose's 2nd Lane, Puddapukur Rd., Bhawanipur, Calcutta.

3170 Mehr Singh. For ink bottles write to Parry & Co., 11, Clive Street ; Satyacharan Paul & Co., 194, Old China Bazar Street and S. K. Dey, 124, Shova Bazar Street ; all of Calcutta.

3174 S. D. Jaini. For instruments for extracting essences, etc. write to P. Mukherjee & Co., 29-30, College Street Market, Calcutta.

3174 K. P. Chettiar. Take eucalyptol, 10 parts : bergamot oil, 3 parts ; acetic ether, 10 parts ; cologne water, 50 parts ; alcohol 9 per cent 100 parts and mix. One part of this essence is to be added to 10 parts of water and sprayed around the rooms frequently. For dyes and chemicals for colouring cloths write to Calcutta Chemical Co. Ltd., Panditia Road, Ballygunge Cal. For required blocks try local engravers to make them as per order. For cotton write to Khadi Prathisthan, 15, College Square, Calcutta. For speedy sale of your goods advertise in pages of newspapers and periodicals.

3178 Har Narain Sethi. Preference shares either carry a fixed rate of interest or are entitled to dividends which are contingent on the profits made during a certain period, as agreed upon at the time they are issued. But in case of ordinary shares no such guarantee is given. Stamp collection is more or less a hobby, so those who are interested in it occasionally pay handsomely for rare stamps.

3180 R. V. Vaidya. Please refer your query to the Principal, Bengal Engineering College, Shibpur, Howrah.

3183 Nialchand Ranchhod Gandhi. The more you use the soapstone, the cheaper will be the product. But excess of soapstone will deteriorate the quality of the soap.

The Ideal Cooker
FOR THE HOME
New manufactures, cheaper prices and larger output are our aims.
Illustrated Catalogue free.
ANNAPURNA COOKER COMPANY.
No 1A, P. O. Thalakwadi,
Belgaum, M.S.M. Ry.

3186 Narayandas Agarwala. Formulas of tobacco preparation to be taken with betel appeared in November 1923 issue.

3187 P. S. Jain & Co. Wants to buy a few copies of Urdu books on homoeopathy.

3189 Toroni N. Dutt Ray. Logwood may be had of Banshidhar Dutt & Co., 126, Khungraputty, Barabazar, Calcutta. For powdered slate enquire of C. C. Parekh's Slates and Pencil Factory, Nagar Koora Street, Petlad, Baroda.

3190 S. M. Natverlal & Co. Oils may be bought of Panchkari Tat & Sons, 6, Mirbaharghat Street and Ananth Tath De, 3, Maidaputtee ; both of Calcutta.

3191 U. Chan Tha & Sons. Aluminium wares may be supplied by Jeewan Lal & Co, 55, Canning Street, Calcutta; Aluminium Factory, Grant Road, Bombay and Indian Aluminium Co. Ltd, 32, Triplicane High Road, Madras.

3193 D. D., Kobbie & Co. Almost all the sugar merchants of Calcutta, Bombay and Madras import sugar from Java.

3194 Balram & Co. For printed tin boxes write to Calcutta Colour Printing & Hollow-wares Ltd., 133, Belliaghata Main Road, Calcutta. For ordinary tin boxes enquire of Gajanand Rampratap & Co., 6, Halsi Bagan Road, Calcutta.

3195 S. Muthusami. Refer your query to Secretary, The Latent Light Culture, Tinnevelly, S. India.

3198 N. Bhatugar. To dispose of arhar dal write to Jogidra Chandra Das, 25, Pollock Street, Calcutta.

3199 Behari Lal Mool Raj Tuli. Glass bangles may be had of F. P. Nalladaroo & Co., 50-1, Canning Street, Calcutta and S. Aktar Husain Ansari, Mohalla Kotta, Firozabad, Agra. Glass cutting machines may be supplied by F. C. Phillips, Stoughton, Massachusetts, U S A. For gota enquire of H. Ahmad Hasan Allawala, 69, Khengraputty, Barabazar, Calcutta. Coaltar may be supplied by Burn & Co., 7, Hastings Street, Calcutta and The East Indian Railway Co., Giridih. Soda water machines may be had of Little & Co, 3, Grants Lane, Calcutta and Vitaldas Karsandas, 364, Upper Duncan Road, Two Tanks, Bombay No. 8. German lanterns may be bought of Sarat Chandra Dass, 198 199, Old China Bazar Street, Calcutta.

3201 Tara Bhushan Banerjee. An article on rice industry appeared in April 1924 issue of INDUSTRY. For machineries write to Marshall Sons & Co. Ltd, 99, Clive Street, Calcutta.

3202 T. L. Narasimham. There is no school under the supervision of Sir P. C. Roy where research work is carried on in dyeing. You may write to the Principal, Serampore Weaving Institute, Serampore, Hooghly, Bengal. It is not possible for a school final passed student to carry on research work.

3203 Bhag Singh. Process of making non-inflammable celluloid appeared in January issue of INDUSTRY. Electrical goods may be supplied by Klaar & Schultz, Berlin S. O. 33, Universitatstrasse 18-20 ; Hendrichs & Co., Elberfeld and W Quehl, Berlin S. W. 63, Ritterstrasse 51, all of Germany.

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29-1, Telepara. Sampooker St, Calcutta.

NOTICES AND REVIEWS.

New Year Calendars.

A sheet calendar has been received from Messrs P. Bhaskaram & Bros., Rajahmundry, stockists of Ayurvedic medicines.

We acknowledge with thanks the receipt of a bold sheet calendar from Messrs S. C. Bose & Brothers, 4-1, Badur Bagan Row, Calcutta.

We are indebted to Mr. Varada Ramamurty of The Aluminium Button Factory, Rajahmundry, manufacturer of all sorts of aluminium fancy articles and buttons in respect of a clear-type big-sized calendar.

We have received from The Imperial Weaving Establishment, Kuppam, S. India, makers of seamless quilts, pillow cases, bed sheets, towels of different patterns etc, an attractive multi-coloured calendar.

Messrs S. Paul & Co., the well-known manufacturing perfumers, of 4, Hospital Street, Calcutta have kindly favoured us with a beautiful picturesque calendar.

A Pocket Chair.

The Dardanos pocket folding chair is a novelty imported by Messrs Mahomedbhoy Jivabhoy & Co., Nizam Street, Bombay, No. 9. It is made of steel with collapsible fixtures ; small and light ; can be folded and carried in the pocket —yes, a Brobdignian pocket !

Confectioners.

Having tasted liberal samples of of guava cheese and Worcester sauce manufactured by Messrs Dias & Co., Bakers and confectioners of Patna Jn. we are glad to be able to say that the products are palatable and appetising. We wish the firm every success.

Rose Incense Sticks.

It is with extreme pleasure that we testify to the very excellent quality of the rose incense sticks forwarded to us by The Anglo-Indian Trading Co., Bangalore City. The sticks, which emit a delightful fragrance, will be supplied to the readers of INDUSTRY at a certain concession.

Notice.

Received from Bhaunah's Modern Magical Company, Krishna Row Sq., Madura a catalogue of appliances.

A Trade Journal.

The East and West Trade Developer, Rajkot. Annual Subscription Rs. 10.

The particular issue lying before us is the special Printers Number. It contains a series of articles all dealing with Typography, Lithography and allied subjects which those engaged in the printing trade will read with profit.

Ink Powder.

Messrs Ramshanker & Co., Agents, Kottar, Travancore have sent us a packet of good blue-black ink powder manufactured by Messrs A. K. Iyer & Co.

Window Envelopes.

After repeated trials Messrs Mohon & Co., 2, Jagadish Roy Lane, Calcutta have succeeded in preparing perfectly transparent window envelopes of superior quality. In the business world of to-day these are not to be regarded as a luxury but as a necessity combining as they do usefulness with facility. We have no hesitation in recommending the swadeshi products to the public for a generous trial.

Indian Boy.

Published by Seva Samiti Scout Officer's Council, Meerut.

This is an Anglo-Hindi Monthly Magazine for "those who never grow old." What with the funny storiettes, tid-bits, puzzles etc. the journal will undoubtedly captivate the juvenile mind as is intended.

The Goan World.

Published for the Indo-Portuguese Publicity Bureau, Post Box 3555, Girgaun, Bombay 4. Annual Subscription Rs. 4.

This monthly magazine aspires to be the recognised organ of the Indo-Portuguese residents in the British Empire. There are serious articles and short stories making the subject matter altogether interesting and instructive.

March Issue of Industry

(In the Press.)

The March issue of INDUSTRY will contain valuable technical articles in addition to Formulas, Small Trades, New Ideas and useful features. Any friend of our subscribers may get a copy free as sample on application to Manager Industry, Shambazar, Calcutta

Trade Enquiries.

[To communicate with any party address by name and number under care of INDUSTRY when the letter will be duly redirected]

3211 K. R. Bhaskariah & Bros.—Desire to be introduced to Bombay firms dealing in dextrine, and sewing thread.

3228 M. G. Pal.—Wants to purchase litho stones.

3240 Hiralal Chunilal.—Wants the names of big buyers of peacock feathers.

3292 B. Govindasami Chetty & Sons.—Enquire where to get jabira seeds and kirimanjee.

3304 Ganesh Prasad.—Wants to be put in touch with wholesale tobacco merchants of Indore, Gwalior, Ajmer and Bikaner.

3306 G. Subba Rao.—Enquires where pure and genuine *salamisri* can be got from the Punjab and Kashmir.

3337 K. S. V. Nath.—Wants a capitalist with Rs. 50,000 to start a large touring Indian Magic Company. Can supply large quantity of leather bits.

3349 J. Walapershad.—Offers services as maker of socks.

3352 D. Subbaramaiah.—Can supply margosa seeds as well as the oil in large quantities. Can also supply mango pickles.

INDUSTRY

Is a monthly Journal of Technology and Handicrafts, Science and Commerce, Agriculture and Business The rate of subscription is as follows:—

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Industry is published at the end of every month

Subscribers are enlisted at any time of the year but they will receive only the number from April to March comprising a complete volume for one year's subscription.

At the time of sending a V.P.P. only the current number is generally sent. The previous issues of the volume are sent per book-post on receipt of the value of the V.P.P. For particulars and Advt. rate please write to—

Manager, INDUSTRY OFFICE,
Shambazar, Calcutta.

Managing Editor—MR. K. M. BANERJEE.

INDUSTRY
A Journal of Technology Handicrafts & Commerce

Vol. XV. *CALCUTTA, MARCH, 1925* *No. 180*

A Survey of the Year.

WE ASK leave of our readers to indulge in our annual stock-taking. While this periodical survey inconveniences none, it helps to apprise the readers of what they have actually received and what they can reasonably expect from us. Incidentally it leads to a careful scrutiny of our procedure resulting in self-criticism and readjustment.

A cursory glance into the volume we are closing with this issue will show that we have not failed to proceed with judiciousness in the selection of themes for our deliberation. The raw materials in which India is rich, such as rice and cotton which supply the prime necessities of man in the shape of food and clothes came in for their due share in special issues. The textile number was a fitting sequel to the above while the perfumery number was extremely opportune during Dusserah season. Having gained knowledge in these primary requisites it is an easy step from raw materials to manufactured products. For starting an industry the essentials are information about the natural occurrence of raw materials and the ready market for finished products.

The signs of the times are propitious—as we have already indicated in our last issue. There are surplus budgets in some provinces and balanced budgets in others. The revenues of the central government are also above par. These would augur better prospects for trade—if not a boom, at least a revival after the slump.

Our readers must be prepared to take to commerce and industry in greater measure. We will assist them in starting manufactories and establishing business of their own. Many are the schemes and projects we have kept in view for the furtherance of this object. For one thing we wish to improve INDUSTRY both as regards quality and quantity to facilitate better and fuller comprehension.

A directory of swadeshi goods will be one of the regular features of the new volume. In order to facilitate its compilation our readers would do well to furnish names of bonafide manufacturers of swadeshi goods with Indian men, money and material. In that way they will render a service not only to their fellow brethren but also to the cause of Indian industrial progress.

For fifteen years INDUSTRY has been wielding a very decisive force in the up-building of economic India. With divine benediction we hope to continue in this useful career for years to come. In a way INDUSTRY has helped considerably in the unification of India for its readers comprising persons of diverse class, caste and creed and representing all shades of opinion possess all a common purpose, viz., the economic regeneration of the mother land. It has bound together thousands of progressive people from the farthest corners and remotest villages of this wide, wide land in the common tie of industrial activity. And that bond is certainly enduring as it is based on mutual co-operation; interchange of suggestions and exchange of ideas.

If there be a hearty combination of the fruitful resources of INDUSTRY with the pushful enterprise of its readers there is scarcely anything in the industrial field that could not be achieved. Make, therefore, "progress" your watch-word even as we have made "service" our motto. For if we render the service on the scale we purpose to do, your progress up to your highest expectation may be assured.

Bronzing of Plaster of Paris Articles.

THE bronzing of articles made of plaster, terra-cotta, wood, and other non-metallic substances may be effected in various ways. In many cases metals are electro-deposited on non-metallic surfaces, and then the subsequent bronzing is a colouring of the deposited metal.

Plaster figures may be bronzed with a green patina by the following process.

(A) Boil some linseed oil with caustic soda, so as to form a neutral soap, then add a concentrated solution of common salt, and boil until grains of the soap float on the surface. Filter and well press the precipitate until all the lighter particles are removed; then dissolve the soap in distilled water and filter off any insoluble residue.

(B) Prepare a clear solution of 4 parts copper sulphate and 1 part iron sulphate, boil, and add a little at a time a portion to the above soap solution, (A), and well boil. Wash the precipitate and add it to the remaining solution of sulphates. Well wash the precipitate by decantation with hot water, then with cold water, and finally filter it off.

Take 3 parts of boiled oil, 1½ parts of the above prepared soap of copper and iron (B) and 1 part of pure white wax, and melt the whole together. Heat the plaster figure to about 80°C, and apply the molten mixture. If the article is small, it may be immersed in the composition, then removed and dried at 80° to 90°C. The operation is repeated until the plaster will absorb no more of the liquid; it is then left to stand exposed to the air until all odour disappears, and finally rubbed with a pad of fine linen.

INDIA'S INDUSTRIAL PROGRESS.

Indian Cotton Research.

A great step in Indian cotton research has been taken by the inauguration of the technological research laboratory and spinning laboratory in Bombay. As our readers are already aware the Indian Central Cotton Committee has long been planning for efficient research in cotton to improve the quality of Indian cottons, and the opening of the laboratory is a part of the scheme. The spinning laboratory has already been equipped with a complete spinning plant and with an exhaustive range of instruments for testing cotton yarn. The technological research laboratory will be equipped with the necessary staff and fittings to enable a thorough chemical, microscopical, and physical examination to be made of each specimen of cotton sent for trial.

Mineral Wealth of India.

India is a wonderfully mineralised country with rich deposits of gold, copper and manganese, iron and other valuable minerals. A mining institute located in the area of Chota Nagpur, where such minerals exist in abundance will provide young Indians of a geological turn of mind with a profession which would give them an independent career. Iron ore deposits are plentiful all over India, and if only the work is properly organised and controlled, the deposits can be worked not only to supply all India's needs but also for good export trade. Copper deposits have been found in many localities, but no serious endeavour has been made to exploit them except in a belt in the district of Singbhum. In the direction of petroleum, much can be done by an institute of mines. The resources of Bengal, combined with those of Assam and Burma, are large enough to supply all India's needs. The exploitation of the country must depend on private enterprise.

Power Alcohol in Mysore.

It is reported that under the auspices of the Mysore Government a factory is being built for the manufacture of sugar and alcohol from molasses. It is hoped that the factory will soon be ready for operation.

Rosin and Bobbin Factories.

Two important companies have been formed to take over from the United Provinces Government the Government Turpentine and Rosin Factory and the Government Sawmill and Turnery at Chutterbuckganj, near Bareilly, viz, the Indian Turpentine and Rosin Company Ltd., and the Indian Bobbin Company, Ltd., with offices in the Civil lines at Cawnpore. The business acquired by the Companies includes a concession in the shape of first option on and guarantee for the supply of crude rosin from the Kumaon forests and timber from the Government forests for the manufacture of bobbins and other turnery articles.

Lens Making.

A LENS is a piece of a transparent substance fashioned into a shape affording two regular opposite surfaces, both curved, or one curved and the other plane. The curved surfaces are usually spherical.

According to their curvature, they are either spherical, cylindrical, elliptical, or parabolic. Those used in optics are always spherical. They are usually made either of crown-glass, which is free from lead, or of glass, which contains lead, and is more refractive than crown-glass.

The chief uses to which lenses are put are in the making of optical instruments such as telescopes and microscopes and in the manufacture of spectacles. The operation of lens grinding is briefly described.

Lenses are so ground that their faces shall form a portion of a spherical surface. The implements employed are, first, a concave shell of cast-iron. This is cast from a wooden pattern of the true curvature of the lens, formed by means of a templet having a radius equal to that of the required curve, and by it, with the aid of coarse emery, the lens is ground approximately to the true form. Two templets, one convex and the other concave are made of sheet-brass or copper, or, for large-sized lenses, of crown glass. These serve as guides for turning what are, technically known as 'the convex and concave tools' to a proper sphericity.

The piece of glass of which the lens is formed is clipped around the edges to bring it to a circular form by means of flat pliers of soft iron, which does not slip from the glass as steel would, leaving it of somewhat greater diameter than the finished lens, and is then attached by means of cement, to a concave, circular hold-fast, somewhat smaller than the lens. The concave shell is now used for bringing the glass to a spherical surface. For this purpose emery is employed, coarser at first and then finer, as the face of the lens begins to assume its true form. The shell is turned both circularly and transversely of the lens, so as to bring the two surfaces in contact in every possible position in order to insure perfect sphericity. From time to time the concave tool is ground in a similar way upon the convex tool in order to preserve the correctness of its surface.

The lens is polished in one of the iron shells, the interior of which is coated with cement, over which a piece of cloth is placed and pressed into shape by the convex tool. This is covered with putty powder (peroxide of tin). The manipulations are similar to those just described. Finally, the edges of the lens are ground to their true diameter.

A 'runner' of cast iron of about half an inch less radius than the templet, is sometimes used as a support for common glasses, a number of which are ground together.

Another contrivance for polishing lenses and other bodies of spherical form consists of a cup connected by a ball and socket joint and a bent arm, with a rotating up-right shaft set concentric to the body to be polished. The cup, being set eccentrically on the joint, has an independent rotation at the same time that it revolves around the common axis. This prevents any part of the surface of the cup from coming repeatedly in contact with the same parts of the body which is being ground or polished.

Saltpetre Manufacture in India.

POTASSIUM NITRATE has been produced in India from very early times. The most important centre of production at present is Behar. In this province, says Mr. Cottrel, an agricultural population of over 300 per square mile supplies an abundance of organic nitrogen, the climatic conditions are ideal for the growth of the so called "nitrifying bacteria", the soil around the villages is well-stocked with potash from the universal use of wood and cowdung for fuel, and the continuous surface desiccation following a small rainfall, causes the subsoil water to bring to the surface an efflorescence of salts in which potassium nitrate is conspicuous. Saltpetre is also extracted in the United Provinces and in the Punjab. The supply of saltpetre is almost entirely obtained from the soil in the immediate neighbourhood of human habitations, or of abandoned village sites, where nitrogenous organic refuse, consisting largely of excrementitious matter of men and cattle has accumulated.

The process of manufacture is briefly described by Mr. Hutchinson. The surface soil, scraped to the depth of a quarter of an inch, is mixed with an equal quantity of residual earth from previous extractions and put into a circular filter-bed, consisting of a mud wall and floor plastered with clay, and having a bottom layer of bamboos and straw. The earth is trodden down in this filter bed and then water is poured over it. After percolating through the filter bed the liquid is caught in an earthenware vessel. The first runnings contain most of the nitrate, mixed with common salt. The solution is concentrated in an open pan over a fire of wood or dead bamboo leaves, the ashes of which, being rich in potash, are added to the extracted earth, which is mixed afterwards with freshly gathered soil. The crude-salt obtained on crystallising the concentrated liquor is sold, usually through a middleman, to the refiner, who works under Government supervision. The crude nitrate earths contain on an average about 3 per cent to 5 per cent of saltpetre. The crude product of the Bihar and United Provinces yields 40 to 50 per cent refined saltpetre, the Punjab crude about 30 per cent.

At the refineries the crude saltpetre is dissolved in boiling mother liquors from previous operations, the water content being such that most of the common salt and other impurities remain undissolved, while potassium nitrate forms a saturated solution. After settling, the hot liquor is run into wooden vats where it is allowed to crystallise.

The refined saltpetre is in the form of large brown crystals and is sometimes further improved in quality, by a process of washing with cold water. This refined or "grough" saltpetre requires further purification before it can be used for the manufacture of gun powder and other explosives. This purification process is one of recrystallising and washing, the chief impurity (common salt) reduced to less than ·005 per cent.

Papadams.

(BY A PRACTICAL EXPERT.)

PAPADAMS are pulse cakes used in many parts of India as adjuncts to staple dishes. On being fried in ghee or oil they puff up considerably and become remarkably crisp. When served hot they are very appetising and therefore, much relished. Papadams are made mainly of ground pulse worked with pulse meal, spices, oil, etc. The dough is kneaded for some time and then divided into small bits. These are subsequently rolled out into thin circular flaps measuring from 4 to 8 inches in diameter. Different kinds of pulse are employed and spices are added according to taste. Oil is incorporated for preservation. Pulse meal is known in the vernacular as *byasan*.

The pulses we have mentioned in the recipes are common items in our dietary and therefore need no description. We have used only Hindi names so that they may be easily recognised.

(1)

Soak *moong* pulse in water : remove the bran by rasping in several changes of water. Strain away the water and bray the soft pulses into a fine paste. Incorporate gradually into this paste a quantity of fine gram meal sufficient to convert the mass into a stiff dough. Knead the dough intermittently with the addition of the meal for 2 or 3 hours. Divide the mass into small bits and roll out each into thin circular flaps dusting with gram meal. Keep them separately. Dust them when dry and pack in tin containers.

(2)

Soak *urid* pulse in water : remove the bran by rasping in several changes of water. Spread them over a bamboo mat so that the water may strain away. Grind them thoroughly, mix meals of *matar* pulse and make into a soft stiff dough. Knead it until soft.

Divide the mass into small bits dusting with meal. Knead separately and pack when dry.

(3)

Soak large *matar* pulse in water. Wash them when thoroughly soaked. Grind them well. Mix *matar* meal to make a stiff mass. Knead vigorously for some time. Divide the dough into small bits and roll them out with meal of *chana* into thin circular flaps. Keep them separately and pack when dry.

(4)

Soak *khesari* pulse in water ; wash them when thoroughly soaked. Grind them well and mix gram meal to make a stiff paste. Knead the mass for some time until a smooth soft dough is obtained.

Divide the mass into small bits and roll them out with *khesari* meal. Spread them out and pack when dry.

(5)

Take equal quantities of *moong* pulse and *khesari* pulse without bran and soak in water. Bray into a paste and mix meal of *khesari* pulse until the mass becomes stiff. Then knead into a dough.

Divide it into small bits and roll out into thin cakes. Pack in tin boxes.

(6)

Soak *chana* pulse free from bran in water. Bray into a paste. Mix meal of *matar* (of the smaller variety) until the mass becomes hard. Now knead vigorously until the dough is soft. Divide into small bits and roll them out into thin cakes. Spread out and pack.

(7)

Soak equal quantities of *chowli* or and *moong* pulse free from bran in water : bray into a paste. Add meal of *khesari* pulse to make a hard mass. Knead until soft and divide into small bits. Roll them out into thin flaps with with meal of *khesari* pulse. Spread them out separately and pack when dry.

(8)

Boil *khesari* pulse until it becomes soft ; strain away the water : bray into a paste ; mix meal of *khesari* pulse to make hard mass. Knead into a dough and divide into small bits. Oil a wooden slab and roll out these bits with a rolling-pin. Spread them out separately on plantain leave and pack when dry.

(9)

Boil *matar* pulse until it becomes soft ; strain the water and bray into a paste. Add meal of *matar* (smaller) to make a hard mass. Knead thoroughly incorporating black pepper in powder as a spice. Divide into small bits and roll out with *khesari* meal. The cakes are spread out to dry and finally packed.

(10)

Cook *sonamoong* pulse well in water : strain the water and bray into a paste. Mix gram meal to make a hard mass. Knead thoroughly ; then add a little mustard oil and knead again. Incorporate saffron and fennel both in powder. Divide the dough into small bits and roll them out with oil. Spread out the cakes on plantain leaves and pack when dry.

(11)

Boil *chana* pulse until it is soft ; strain away the water and bray to a paste. Add *moong* meal to make a hard mass. Knead thoroughly ; and incorporate the following spices : cassia leaves, capsicum, coriander seed, black pepper —baked and powdered—in suitable proportion. Knead again and make into a dough. Divide it into small bits and roll them out into thin circular cakes with oil. Spread them out on plantain leaves and pack when dry.

(12)

Boil together *matar, khesari* and gram pulse in equal quantities until soft. Strain away the water and bray into a paste. Mix *moong* meal to make a stiff mass. Add a little mustard oil and knead thoroughly. Incorporate the following spices : cassia leaves, cardamom major, cloves, black pepper in powder. Knead again into a dough ; divide into small bits. Roll them out with oil and place the cakes separately on a plantain leaf. Pack when dry.

(13)

Boil potatoes and peel when soft. Rasp them and mix in meal of large *matar*. Knead the mass into a smooth soft dough. Divide it into small bits and roll them out with *khesari* meal. Spread out and pack when dry. The product will be very palatable and crisp. Potatoe papadams are much relished.

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Cement Concrete.

USES OF CEMENT CONCRETE.

THE uses to which cement concrete is put are widely known. It may be put to the following uses :—

Whole buildings, hearting and backs of walls, foundations for buildings, damp-proof courses, pillars and bases, floors, workmen's quarters, steps, stairs and platforms, sewage tanks, urine tanks, water troughs, water-supply reservoirs, sills and lintels, dynamo and engine sheds, weirs, sluices, bathrooms, silencer pits, refuse pits, garden walls, retaining walls, sea and wharf walls, wells, culverts, bridges, bridge piers, drain pipes, and joints, garages, chimney copes, fencing posts, water channels, garden rollers, clothes poles, arches, stables, ornamental garden vases, garden path edging and seats, dog kennels, manholes, seats for lathes and saws, paths, etc. etc.

Where effect is desired, the concrete may be tinted to any desired shade, and will fulfil its purpose at the minimum of expense and without offending the sense of the artistic.

METHODS OF BUILDING WITH CEMENT CONCRETE.

Building with concrete is carried on in two ways. Firstly by making it in moulds into great artificial blocks of stone and using them as ordinary large stones are in masonry. The blocks are made in a mould with detachable sides, and can be made of any size and shape. Wooden moulds are generally used. Care must be taken in making and erecting the moulds, and they should be lightly rubbed with paraffin oil or grease before being set up, to prevent adhesion between them and the concrete. The concrete should be carefully tipped into the mould within about half an hour after mixing, otherwise setting will have commenced, and to prevent the formation of air pockets, only small quantities may be put into the moulds at a time, and then thoroughly rammed. When set, the sides of the mould may be removed, and the block carefully lifted out. To facilitate the lifting and placing of block, when set, strong iron eyes are often inserted into the soft concrete.

The second method of building with concrete suggests the making of monolithic walls of fresh concrete rammed tight between frames. In this method the concrete is tamped hard between two parallel rows of boards (usually of wood) fixed by means of clamps and screws, at a distance apart corresponding to the proposed thickness of the wall. When the mass has set, the retaining boards are removed, and may be placed higher up to receive the next layer of concrete ; and so on till the required height is reached This method necessitates the uninterupted continuance of the work, which if executed with a bad quality of cement, would ntail heavy loss.

The block-making system is generally preferred. It has advantage o ascertaining the quality of concrete before it is placed in position. Thi advantage is not secured by frame building.

STRENGTH OF CONCRETE.

The tensile strength of concrete i only a fraction of its compressiv strength, and as this may be entirely lost by a sudden jar, it is customary to neglect it entirely in all calculations. To supply the necessary tensile strength to the concrete, steel bars are embedded when the tensile stress occurs, each material being applied so that its distinctive properties are utilized to the best advantage. Such a combination of steel bars and cement concrete is known in Engineering as "Reinforced concrete." It is also called Armoured concrete and Ferro-concrete. In the next article, I propose to discuss the general principles of Reinforced concrete under a separate heading.

ADVANTAGES OF CONCRETE.

'The principal advantages of concrete are : the convenience with which it may be placed, particularly in otherwise difficult situations or under water, its availability for sub-aqueous work ; its cheapness, due largely to the convenience of placing and to its use of stone too small for masonry; and its fire-resisting qualities, as compared with lime-stone (which calcines) and with granite (which splinters). While modern art has very much facilitated almost all other kinds of work by the use of mechanical contrivances, brick-work still remains as completely as ever hand labour, requiring skilled workmen, and taking a long time to do. Now, by substituting concrete for brick and stone masonry, we do away with the necessity for the skilled, and consequently expensive workmen, as any ordinary labourer can mix the ingredients and ram them down when mixed.

DISADVANTAGES.

'Concrete is rather weaker than good rubble masonry, and has only about half the strength of first class ashlar masonry of granite with thin joints in cement. Like both the stone and the mortar in masonry, it is subject to deterioration, especially in sea water, but this difficulty is being eliminated by the care which is given to the manufacture of cement and which is fostered by its extensive use and by the conduct of its manufacture on a large scale. As in all human work, and notably in the laying of masonry, care is necessary in order to secure faithful performance, upon which the success of structure so intimately depends. The quality of the finished work may, however, be tested by borings.'

—BY MR. R. K. MIRCHANDANI.

Knitting with a Knitter.

IN order to learn knitting thoroughly it is necessary to first become acquainted with the parts of the knitter and their respective works. They are as follows :—

(1) The handle connected with a (2) standing wheel which when moved gives motion to the (3) cogwheel, the teeth of which are connected with the (4) gear wheel. On this is placed a (5) rotating cylinder to the inside of which (6) a stationary cylinder is fixed with screws at the bottom of (7) the seat of the machine. By the side of the first wheel and connected with it is fixed (8) a measurer which shows the number of

rounds made by the wheel. The rotating cylinder contains (9) a tension rod inside and there is (10) a tension pointing arm with screw outside so that tension may be observed and regulated. To each side of the tension rod there is a (11) cam which lifts the needles up. There is a (12) perpendicular rod attached to the seat of the machine to which (rod) is attached another horizontal rod leaning over the machine. In both of these rods there are holes at the ends and also in the middle of the horizontal rod through which the yarn passes. There is a (13) pulling hook in the horizontal bar to which yarn is attached at the time of making the heel and the toe to give further strain to it in order to make these portions stiff. By the side of the rotating cylinder there is (14) a thick pin to which (15) the dial is attached, (only at the time of making ribs of the socks) leaning over the fixed cylinder. There is a (16) thick nail inside of the fixed cylinder attached at the bottom of the machine, and having (17) a hatch outside to the left hand side, which when pushed gives a slight move to the dial to bring it to the required position as mentioned below. The dial contains its own (18) tension device and (19) a batch to stretch its needles. The upper fitting of the dial contains (20) arrangement for raising and lowering it towards the cylinder. It is so fitted as to keep its needles between the top end of the cylinder and the top end of its (cylinder) needles and the knitted portion going in remains visible.

There are separate (21) needles for the dial and the cylinder. There are (22) weights to be attached to the knitted portion to keep it strained and straight. There is (23) a bunch of hooks which expands and contracts and is used in filling yarn at the commencement.

WORKING.

In the dents the fixed cylinder needles are inserted. The bunch of hooks is inserted in the fixed cylinder from towards the bottom and expanded to let the various hooks touch the cylinder all round. Two bobbins are placed just by the side of the standing rod, their yarns are passed together through the holes meant for it and described above and finally passed through a hook meant for it in the rotating cylinder. About half a yard of the yarn is pulled by the hand and commencing from its end it is attached to each of the needles and a corresponding hook of the bunch. The bunch is held by the left hand with a little strain downwards and the handle is moved by the right. After some 5-10 rounds have been given a weight is attached to the bottom hook of the bunch which strains the knitted portion. As the machine moves on fresh yarn is continuously being supplied from the bobbins. As the cylinder moves, the needles that come in contact with the cams are lifted up, the yarn in them moves down up to their humped portion, and as the contact of the needles with the cams is removed by the latter's moving further, the needles again go down, raising their tongues by the passage of yarn over them. The tongues touch the bill (bent upper portion) of the needles, so to say, closing the bill thus allowing the yarn to pass over to the inner side of the fixed cylinder knitting with the yarn newly supplied to them. In this way automatic simple knitting is performed.

While making the ribbed portion the dial is fixed to its pin with its needles inserted in the dents. The needles are stretched by the hatch. They should be just between two needles of the cylinder. If they are in straight line with the cylinder needles their coming out horizontally would be stopped by the latter. If they are not in the middle of the space between pairs of cylinder needles as required the thick nail inside the fixed cylinder is given a push from its hatch outside and the nail moving the dial brings the needles at the proper place. While the machine is moving the pin to which the dial is hung also moves. the needles come out, take yarn and throw the previously taken yarn knitting with the new. Their action is similar to that of the cylinder needles with this difference that the dial needles work horizontally. In this way double knitting is performed which makes the rib-like portion of the socks etc.

MAKING OF THE HEEL AND TOE.

The making of the heel and the toe also requires special mention. The fixed cylinder contains a mark on two of its opposite dents, on the right and left sides dividing the dents in two halves. While making the heel only the needles in the lower half to the side of the worker are worked with and the needles to the upper half are drawn up and left standing in the cylinder. These would not take fresh yarn but retain that already in them. In what we call "double heel" one more thread of yarn is added. While making the heel, the handle is moved a bit slowly and is given back motion after all the needles in the half cylinder have taken yarn. The cylinder thus moves from left to right and again from right to left. After one round of this double (left to right and right to left) knitting, one further needle to each side (2 in all) is raised and another half round is given. In this way needles are raised and part rounds are made until only about 10-12 needles are left working. This would be the pointed portion in the heel. The needles that have been raised are then seated one by one (the opposite two at a time) until the needles in the half cylinder are again working. This finishes the heel. The third thread is cut off and removed and the standing needles in the other half are also seated and knitting of the foot is commenced. While making of the toe the needles in the lower half are lifted up and the upper half needles are worked similarly to the ways in which hells are made, i. e. first lifting needles one by one and then lowering them back after the point has been reached. In making heels and toes the yarn on the horizontal bar above the machine is given additional strain by attaching it to "pulling hook" and at the bottom of the machine also a hook with weights is attached into the knitted portion just at the heel or the toe. While both the hands are in work one moving the handle and the other raising or lowering needles, the "point-hook" attached to the bottom is caught by the foot and kept strained.

This is how the machine is worked. The sock consists of 4 parts. The leg which contains the ribs and simple knitting, the heel, the foot and the toe. After the rib is completed the stitch in each of the dial needles is passed over to the corresponding cylinder needle stitching with the thread in the latter. This is done by the hand taking out one needle and passing its thread over. When the thread in all the needles is thus passed over the dial is removed and placed aside to be used again at the commencement of another sock. The only thing to be said now is about the lengths. The length is fixed on the number of rounds shown by the "measurer," but the workers do neither understand its use nor use it. They measure the knitted position up to a certain place in the machine which they have fixed.

After one sock is finished i. e. after finishing the toe the thread is not cut off but some 2-3 full rounds with a very loose tension are made in order to separate the 2nd sock which is commenced in continuation of this loose net-work. After a number of socks have been made a thread in the last loose net-work is broken off and by pulling the broken thread socks are separated from the machine leaving some portion in it to continue. Each of the socks is then separated from the other by breaking of a thread of the loose net-work. Unnecessary loose knitting is removed. The open mouth at the toe is stitched by the hand with help of knitting needles by crossing one stitch with another to the opposite sides. Holes and patches formed in the sock while being knitted are also stitched with the help of machine needle. The completed sock is passed over to be ironed. In order to iron it a wooden board of the size and cut of a foot is inserted in the sock and the sock is fitted over it. Some water is sprinkled and a heated iron containing burning charcoal inside is passed over each side of the sock to give polish to it. After folding the finished socks in pairs the fold is again pressed by the hot iron. After packing and binding the pairs in dozen or half dozen they are ready for sale.

Other accessories of the machine are a "folding swift" around which hanks of yarn are inserted and a wheel to the nail of which bobbins are fixed and the yarn is wound on them. A wrench and a screw driver are supplied with the machine to remove and fit any of the parts. An oil-pot is also supplied and the machine is cleaned and oiled twice daily before the commencement and after the completion of the day's work.

—BY MR. AMBA PRASAD TEWARI,
Ujjain, C. I.

Ideas for Small Capitalists.

Sheep Farming.

Mr. K. Varatharajulu C/o Mr. K. Krishnaswamy Chetty, Merchant. Chandragiri, sends us the following :

It is a fact that the consumption of food stuff is increasing with the population. We obtain milk, wool, mutton, and skins from sheep and we should not forget the value of its dung to agriculturists.

The first thing required in sheep farming is about an acre of ground (a waste land near the residence which can be had on rent or can be bought cheaply) enough to supply 100 to 150 sheep with grass daily. The plot of ground should be fenced and some portion of it should be reserved for making rest-houses for both lambs and sheep.

Waste lands, generally, contain no good grass and therefore it ought to be ploughed and sown with some good grass seeds.

SELECTION OF GRASS SEEDS.

There are two familiar kinds of good grass seeds in India, namely Lucerine and Evergreen. In districts with light rainfall (below 50 inches) the Lucerine grass lasts for 3 to 4 years, but where the rainfall is heavy, it is destroyed by the heavy rains and therefore it should be renewed annually from seeds. Therefore this kind of grass is not suitable for sheep farming in districts of heavy rainfall. Evergreen grass lasts for many years and therefore it is suitable for districts of both heavy and light rainfall though it yields a little smaller than Lucerine grass.

METHOD OF CULTIVATION

Plough the ground 4 or 5 times during dry weather, so that all the weeds may be destroyed and manure it heavy. 4 cart loads of farm-yard manure is sufficient for an acre. Sow the seeds during rains where the rainfall is light, but where it is over 50 inches September to November is' the most favourable season. The seeds can be sown broad-cast covering the seeds lightly with the soil by means of a harrow.

Then fence the whole plot with bamboos or any other cheap and strong article to the height of 5 or 6 feet and divide the plot into 3 equal parts A, B C by means of fencing.

A month after sowing, sheep can be allowed to graze in part A for 10 days, after that in B for 10 days and then in C for 10 days and again in A for 10 days and so on. By this method of rotation every plot will have 20 days time to have full growth for the grass. Thus there will be fresh and regular supply of grass throughout the year.

There are some important points to be carefully noted to keep the meadow fresh for ever.

1. Grazing should not be allowed for 1 or 2 days after heavy rains, as the treading of sheep will cause the grass coated with mud, spoiling the freshness of the grass.

2. Water should be sprinkled over the meadow once in 15 days during very hot weather.

3. · The dung ought to be swept after the stoppage of grazing in every part.

The hut required for sheep to shelter can be built of mud and roofed with palm-leaves. The size of the hut to be constructed is 40 x 30 feet which is sufficient for 150 sheep and this can be divided into two, one for sheep and another for lambs. This hut will cost Rs. 30 at most.

After having done this the person is simply to go to neighbouring villages to purchase about 60 ewes, and 6 rams. It is quite possible to buy matured ewes at Rs. 6 each and good bred rams at Rs. 8 each.

Coming to the facts and figures it is evident from the following statement that income in this business increases cent per cent every year.

Capital required.

Cost of fencing	Rs.	30-0-0
Cost of hut	Rs.	30-0-0
60 ewes at Rs. 6 each	Rs.	360-0-0
6 rams at Rs. 8 each	Rs.	48-0-0
Total	Rs.	468-0-0

Capital required is about Rs. 500.

For milking and selling milk etc. a shepherd will be required who will look after the sheep, meadow, etc.

Some ewes will give birth to 2 lambs at a time and some only one. The 60 ewes will yield, without any doubt, 60 lambs within 6 months. The lambs should be allowed to graze with the sheep and during night they should be separated in order to get milk from the sheep in the morning. So milk will be obtained only once in a d y. The cost of milk on average will l Rs. 2 a day. If this industry is start in villages where milk is in abunda e, ghee can be obtained and sold i neighbouring towns at the same averag cost., i. e., Rs. 2 a day. The shephe can sell the ghee once in a week.

During the months of ebruary and March some merchants d ing in wool trade will purchase the w on contract system at as. 8 per sheep more. The contractors will bear the st of croping and cleaning the wool.

Total Incom

Cost of milk or ghee at Rs. 2 a day for 6 months	Rs.	360-0-0
60 lambs at Rs. 4 eac on average	Rs.	240-0-0
Selling price of woo at as. 8 each for 66 sheep	Rs.	33-0-0
30 cartleads of sheep-dung at Rs. 2 a cartload	Rs.	60-0-0
Tota	Rs.	693-0-0

Total Expend e.

Cost of manuring	Rs.	5-0-0
Cost of ploughing	Rs.	5-0-0
Cost of seeds at Re. 1 a lb.	Rs.	15-0-0
Salary for a shepherd at Rs. 10 per mensem	Rs.	120-0-0
Rent for the land at Rs. 5 p. m.	Rs.	60-0-0
Total	Rs.	205-0-0

Total Inc e Rs. 693-0-0
Total Exp nditure Rs. 205-0-0

Net p it (annual) Rs. 488-0-0

If the pr ietor has a waste land of his own he c save Rs. 60. Then his net profit pe ear will come to Rs. 548.

To Wr Ornamental Glasses.

Mr. M. hafur Ahmed, C/o Mr. Karam B shohalla Kalal Majri. Ambala City Sends us the following—

The follo g is the most easy and paying indu y which can be undertaken by the udents who want to earn some thing le learning. Two school boys in An la City to whom I gave the idea are tising this work in their spare time d they are easily earning Rs. 30 to R a month. Try it once and you are e to be successful. Because in co arison with the capital required in work the outturn and the profit a astonishing.

MATERIALS.

The thin required are :—(i) Glass **sheets of 1** 14" (big or small as **desired)** lozen. (ii) 6 drawing **brushes say** rom No. 1 to 6. (iii) 8 **small china** earthen pots for dissolv**ing colours.** iv) ½ oz. of each of the **following oi** soluble colours: white, **black, red,** se, green, blue and yellow **and two sm** packets of bronze powder **of silver a** l golden colours, (v) 6 **simple wood** frames and 6 pieces of **cardboard e** l in size to that of glass **sheets. (vi** Two oz. of varnish for **dissolving t** colours.

PROCESS.

In writing on these glasses everything is just the reverse to writing signboards. Because in writing boards at first the ground is painted (on the upper side of the sheet of iron or wood) and when it dries up the letter are written upon it with any other desired colour. But in writing on these glasses at first inverted letters are written on the under side of the glass sheets and when the letters dry then a coat of any other colour is given upon the same side on which the letters are written to form the ground. Now as the glass is transparent the inverted letters will be seen all right on the front side. One difficulty is that if one does not know to write inverted letters what shoud be done. Then take a sheet of glass write with any colour one side in the usual way ; the letters will be seen inverted on the other side of the glass. Now carefully trace these letters so as to make a true copy of the letters written on the front side with any desired colour. Then rub off the letters you have written first with a rag dipped in kerosine oil and make the front surface quite clean. Let the inverted letters dry and then colour the group with any desired colour on the same side on which the letters are written, let it dry too. After this always give a coat of black colour on the colour of the ground because it will lose the transparency of the glass and at the same time it will have no effect on the colours of the letters and that of the ground. Now when the black coat has dried take the piece of cardboard and the frame, and frame it in the same way as pictures are framed. The glass is now ready for sale. To make the glass more pretty the letters and the ground should be given suitable colours, e.g. if the letters are of the blue or violet colour the ground should be of rose colour and so on. The point of importance is what should be written on the glasses to sell them at sight. Religious verses from the sacred books such as the Koran, the Gita, the Bible, etc ; some vernacular verses containing any good moral lessons ; proverbs and precepts; mottos and quotations may be written with advantage; secondly write small but beautiful signboards for the shop keepers as they like nice glass signboards. To sell this kind of glasses a person should go to a place which is often visited by people of all religion and classes such as railway station, big bazars and some big fairs. The picture and the fancy goods dealers of the city will also buy these glasses in numbers if you will sell the glasses to them leaving a small profit for them.

ESTIMATE.

The capital invested :—

	Rs.	As.	P.
6 Glass sheets	1	8	0
6 Brushes of different No.		7	0
6 Pieces of cardboard		3	0
8 Earthen pots		4	0
Colours		6	0
Bronze powder packets		3	0
Six simple frames		12	0
2 oz. of varnish		3	0
Total sum—	Rs. 3	14	0

Cost of one complete glass :—

	As.	P.
Glass sheet	4	0
Frame	2	0
Cardboard		6
Colour		6
Total sum—	As. 7	0

But the selling price of such a glass is not less than one rupee. Therefore, net profit in one glass is 9 annas. A person can easily write 2 or 3 such glasses in his spare time in a day and 10 or 12 in a holiday. These colours will be sufficient for writing 50 or 60 such glasses, while the brushes and colour pots will go for years.

MISCELLANEOUS.

An excellent and very cheap varnish can be prepared at home in this way. Take one oz rosin (powdered), melt it in an iron pot on the fire, take it off from the fire, let it cool a little but not to harden, add oil of turpentine so as to make it like a syrup. The brushes can also be made with the tail hair of the squirrel or with camel hair. The simple wooden frame can be made pretty by colouring the frame with any of these colours. Cardboard pieces, glass sheets, writing brushes can be had from the local picture and fancy goods dealers, or book sellers and stationers, the colours and varnishes are obtainable from a paint and colour shop and the simple frames can be had from a local carpenter as per order.

Small Trades & Recipes.

Perfumed Pomade.

8 oz. best white wax, 4 oz. tallow, 13 oz. lard; melt these by gentle heat and when it has cooled down, add to it 20 drops oil of bergamot, 10 drops oil, of lemon, 6 drops oil of Peru balsam, 6 drops oil of cloves; stir constantly while the perfumes are being added.

Tooth Powder.

8 oz. of best soap (white preferred), 8 oz. powdered French chalk, 8 oz. orris root, 4 oz. white sugar, 4 oz. rose water, 60 drops oil of cloves, ½ oz. oil of peppermint (strong). Cut up the soap and melt by moderate heat in rose water; rub the oils with sugar, orris and chalk, then add it to the above stirring constantly until all get mixed up well.

Red, Blue, Green and Violet Inks.

RED.

Dissolve 1 part magenta in 150 to 200 parts of hot water.

BLUE.

Dissolve 1 part soluble blue (light blue) in 200 to 250 parts of hot water.

GREEN.

Dissolve 1 part iodine-green in 100 to 110 parts of hot water. For a lighter tint add a little picric acid.

VIOLET.

Dissolve 1 part violet blue in 200 parts of hot water.

Dye-Soaps.

Dissolve in 4 oz. of water 2 dr. of aniline and add to it 4 oz. of gin. Mix ordinary soap shredded and work up the mixture to a paste suitable for moulding and put into moulds. The above quantities are sufficient for the preparation of 2 lbs of soap.

—BY MR. E. S. PADMANABHAN.

To Tint Lamp Bulbs.

The surface of the glass bulbs is first prepared by thoroughly washing in soap-solution and then drying. A bath is next made by heating up the whites of two eggs in a pint of water and filtering. The bulbs are then dipped in this bath and hung up to dry. The aniline colour of the desired tint is now dissolved in photographers' common collodion.

Some hints on colour solution are necessary. Red or blue aniline will form clear solutions, while the green solution will require filtering. Yellow aniline yields a pleasant colour but the surface of the glass presents a frosty appearance after the application. Violet and purple colours may be obtained by combining red and blue in different quantities.

When the colour solution is ready the lamp bulbs, treated as above, are dipped therein and hung up to dry. Finally a current is passed through the bulb for half an hour, so that the heat thus generated may harden the coating of the collodion. The same purpose may be served by placing the bulbs in a current of air.

The preparation, however, can be easily removed with alcohol or sulphuric ether, but is not affected by water. To remedy this drawback the colour should be made light rather than deep and two or three coats should be applied instead of one.

SCIENTIFIC & INDUSTRIAL TOPICS.

The Romance of Pharmacy.

Our readers will be astonished to learn that many pharmaceutical preparations used to-day had their origin centuries—in some cases tens of centuries—ago. For instance, in compound pharmaceutical preparations: Hiera Picra is 2000 years old ; Vinegar of Squill is 2400 years old ; Diachylon Plaster dates from early in the first century ; Syrup of Pappies and Basilicon Ointment were first made in the reign of Augustus Caesar ; Cold Cream was originated by Galen, who died A. D. 200 ; Pil-Cochial is made from a recipe a thousand years old ; Laudanum and Opodeldoc were introduced about the 15th century ; while most of the simple drugs mentioned in the Bible—myrrh, juniper, nitre, saffron, etc., etc are still in every day use.

Modern Pharmacy draws its supplies of raw material from every quarter of the globe ; the source, origin, collection of these can merely be hinted at. The quick silver mines of Spain, the sulphur deposits from the volcanoes of Sicily, the wells of Baku the cocoa leaves from Peru, the cinchona bark from Java and elsewhere, the opium from Asia Minor, rhubarb from China, cascare bark from North America, eucalyptus from Australia are a few familiar examples.

Romance of Pearls.

In a recent number of NATURE there are some interesting notes on pearls. It appears that, according to a French journal a large pearl has been found in a coconut. Where pearls come from has always been a mystery in India, and so long ago as 1240 A. D. a Kashmir physician records them as coming from bamboos, coconuts, heads of elephants, fish, etc Pearls are definite animal concretions of carbonate of lime around a core which may be a foreign body, the egg or some part of the body of the organism, or the egg or part of the body of a contained parasite. True pearls only occur in molluscs, and they are microscopically and chemically identical with the nacre—the inner living of the shell—in all molluscs. Actually the structure consists of a vast number of very thin and corrugated laminae of an organic substance known as conchiolin, holding spicules of carbonate of lime. The transparency, the over-lapping of the laminae, the corrugation, and the angles of the lime spicules give the lustre so well-known in the precious pearls. Somewhat similar concretions may be found in any animal's body, but they are not found in plants, smooth and rounded off in this way. In the Orient generally, the pearls formed by the giant clams of the reefs are termed. "coconut pearls," as their appearance bears a resemblance to the cut surface of, the kernel of the coconut ; they often attain the size of a pigeon's or small hen's egg, the clams themselves, varying up to two feet across, but as they have no lustre they are of no beauty and of no value.

A Substitute for Sugar.

Saccharine, as is well-known, is 200 times as sweet as sugar. But a pound of the new synthetic product alpha-anti-aldoxine of perillaldehyde, is equivalent to a ton of common sugar. It is made from the oil of a plant known to the Japanese as "Schico" and to the botanist as "Perilla", and is two thousand times sweeter than sugar.

It is not in the least like any of the natural sugars in structure, although it is composed of the same elements—carbon, hydrogen, and oxygen, the common elements of all foods. Yet if the same number of atoms of the same elements, attached to one another in the same way, are arranged in a slightly different position, the resulting compound is not sweet at all.

Distances in Space.

A ray of light travels 186,000 miles in a second. Let a light wave start on the Sun, and in just over eight minutes it reaches the Earth. In less than a quarter of a day it reaches the orbit of Neptune. It goes on for days, for weeks, for months, and in a year it is nearly six billions of miles from the Sun but it has not reached a star. After four years or more it reaches the nearest stars, our immediate neighbours of the stellar regions. As the wave spreads out for years, for thousands of years, it is still meeting multitudes of mighty stars, separated from one another by distances, compared to which our distance from the Sun is but an infinitesimal quantity.

Bobbins for Textile Machinery.

Excellence of material and perfection of manufacture are both indispensable in the bobbins which are used to hold yarn in the cotton spinning and weaving industries. The raw material of the bobbin is wood and, from the outset, the user is dependent upon the experience and good faith of the manufacturer in selecting none but the best grades of well-seasoned wood. Good appearance in itself is no guarantee that a bobbin gives satisfactory results in the strenuous service to which it is subjected. Quality of material and design are also required, and even these must be supplemented by the skill of the craftsman. From the earliest days of cotton spinning in Lancashire, British bobbin makers have worked in close co-operation with the spinners and weavers, meeting the innumerable special requirements of the industry and working patiently on special methods of manufacture for the bobbins. Continual research has led to improvements in the seasoning and protection of wood, whilst worldwide experience has resulted in perfection of mechanical details under all conditions of service. As a result of this happy combination of experience and application, British bobbins enjoy a deservedly high reputation, and are used more extensively than those of any other country.

FORMULAS, PROCESSES & ANSWERS.

Dissolving Gums in Spirit.

3314 C. B. Bhatt. Enquires how to dissolve gums in spirit.

Gum copal and gum mastic do not dissolve easily in cold methylated spirit. Place the jar of the ingredient in bucket partly filled with water; put a stove and gradually bring nearly to the boiling point. The jar should not be tightly corked, and should be taken off the stove when stirring. The gums should be broken up small and a quantity of powdered glass added to prevent them from congealing or massing together when heated. The addition of ½ oz. of camphor to each 4 oz. of copal or 1 pt. of spirit will assist in dissolving the gum. Mastic may also be dissolved in Venice turpentine before adding the spirit.

Phosphoric Acid and Alumina.

3234 Po Thaing—Writes, how to remove phosphoric acid from alumina solution.

In presence of phosphoric acid, the phosphates of iron and alumina together with the phosphates of the other elements of the group and those of the alkaline earths will be precipitated upon making the solution alkaline with ammonia. Should iron and alumina be the only elements of these two groups present in the solution, they may be precipitated together as phosphates, iron determined by titration and calculated to the phosphate salt, and alumina obtained. Occasionally, however, it is necessary to remove phoshoric acid.

The following method may be adopted for its removal. The material is fused with about six times its weight of a mixture of 4 parts sodium carbonate and 1 part silex and the melt extracted with water containing ammonium carbonate. Iron and aluminium remain on the filter upon filtration while sodium phosphate passes into solution. Both the precipitate and filtrate contain silica. The precipitate of iron and alumina is dissolved in hydrochloric acid and taken to dryness, the residue dehydrated as usual, then treated with dilute hydrochloric acid and silica filtered off. The solution contains iron and aluminium in form of chlorides.

Ferroprussiate Papers.

3575 Pt. Shama Rao. Requires hints for making ferro-prussiate paper.

There are two kinds of ferro-prussiate blue-print papers: (1) in which blue lines are obtained on a white ground (2) in which white lines are obtained on a blue ground. Hints for making them are given below.

(1) First prepare a solution of 1 part of citric acid and 2 parts of ferric chloride in 20 parts of water. Procure

some plain photographic papers and float them in the above solution for half a minute. The operations must be conducted in the dark.

(2) First prepare two solutions by dissolving (a) 1 part of ferro-ammonium chromate in 4 parts of water and (b) 1 part of potassium ferro-cyanide in 6 of water. Mix the two and keep in the dark. Apply the solution on the paper with a broad camel hair brush.

Verdigris and Vermilion.

3489 Nathunilal Maheshlal—Asks how Verdigris and Vermilion are prepared ?

(1) Verdigris may be prepared as follows :—

Take 160 lbs. of copper sulphate and dissolve in hot water, making the solution very concentrated ; then run in a strong hot solution of acetate of soda. Boil for two hours till the verdigris starts to separate out. Cool and then throw on to strainers and wash sparingly with cold water.

(2) Vermilion may be prepared as follows :

Grind thoroughly 300 parts of quick silver with 68 parts of sulphur. Towards the close of this operation add a little caustic potash. The transformation of the mercury and sulphur into the black mercury sulphide will be completed thereby. Next warm up this product with a strong solution of caustic potash and stir constantly. After some time the black mass will gradually turn brown, and then scarlet red.

Take care that the temperature does not exceed 50° C during the operation otherwise the brilliancy of the colour will be impared. As soon as the desired shade is obtained pour in cold water to wash the vermilion. Finally dry.

Bronzing Brass Black.

3280 Mohd Sherif. Please describe the process of bronzing brass.

Black bronzing of brass (or for that matter of copper, bronze-metal, etc.) may be produced by brushing the metals with dilute nitric acid containing a small quantity of silver solution, and blazing off over the fire. This operation is repeated if after again brushing the articles with the acid and blazing off, the colour is not sufficiently deep. Nitric acid which has been used for dissolving fine silver and then poured off is most suitable for the purpose.

Analysis of China Clay.

3301 R. P., Garhwal. Wants a typical analysis of China clay.

A typical analysis of China clay is quoted below.

Silica	47.1
Alumina	39.1
Ferric Oxide	.6
Lime	.4
Magnesia	.2
Potash and Soda	.3
Carbon	2.6
Water	9.3
Other matter	.4
Total	100.0

Use of Bauxite.

The same gentleman wants to know the uses of Bauxite.

The French bauxite is roughly divided into three classes : (1) white bauxite, this being used for the manufacture of aluminium salts and alum ; (2) red bauxite, used for the manufacture of aluminium ; (3) a special kind of white bauxite, used for making refractory bauxite bricks. The greater part of the material is used in the manufacture of aluminium, but in America large quantities are fused in the electric furnace to produce artificial corundum, which under the name of *alundum*, is largely used as an abrasive agent.

Sealing Wax.

3388 L. H. Sawhmy. Wants a good recipe for sealing wax.

The following recipe will yield a good red sealing wax.

3 lb.	Orange shellac
2 lb.	Venice turpentine.
2 lb. 4 oz.	Vermilion.
8 oz.	Oil of turpentine.
12 oz.	Carbonate of magnesia.

Mix the vermilion and carbonate of magnesia together by shifting. Make the mass into a paste with oil of turpentine. Finally incorporated this paste with the molten mass of shellac and Venice turpentine.

Office Paste.

The same gentleman asks a recipe for a good office paste.

Potato or farina flour	4	lb.
Water	18	gill.
Nitric acid (pure)	7	oz.

Make the farina into a paste with water and then mix in the nitric acid and stir the mixture well. Set aside for 48 hours with frequent stirring. The acid will convert the farina into a dextrine mucilage. Then boil this mass until it thickens. The product is very adhesive. Add a little salicylic acid for preservation ; put into phials and cork airtight.

Manufacture of Glycerine.

3361 Mukherjee Bros.—Want to know how glycerine is manufactured.

Glycerine is largely recovered from the soap making and from "the sweet waters" from the digesters where fats have been saponified with lime or with water under pressure. Spent soap lyes are very dilute solutions of glycerine and contain much impurity. For the recovery of glycerine the lye is settled and drawn off from the sludge. It is then treated with a special chemical called persulphate of iron, obtained by the action of sulphuric acid on pyrites. A precipitate of the hydrate is thrown carrying with it albuminoids and metallic soaps of the higher fatty acids, This precipitate is removed by filter pressing and the clear liquid tested for any excess of iron sulphate. If any is present, it is exactly neutralized with caustic soda and the precipitate filtered off. This leaves the lye almost water white and ready for the evaporation, which is done under high vacuum in a still. The vapours from the evaporator are freed from the presence of lye and then passed on to a wet vacuum pump which is provided with a jet condenser. When the lye attains a density of 32°Be. (1.295 sp. gr.) it contains about 80 per cent of glycerine, and is called crude glycerine.

Dental Alloys.

3550 H. C. Hippayi—Wants to learn the composition of dental alloys.

Silver-platinum alloys are largely used by dentists in the form of wire, sheet, and perforated sheet and under the name of *Dental Alloys*. They are much more durable, and do not blacken so readily as a silver-copper alloy. Two qualities are available in the market the first containing 67 per cent. of silver and 35 per cent of platinum ; and the second containing 75 per cent of platinum. The alloys occasionally contain a small quantity of copper.

Alloys of silver and tin are also largely used by dentists as the basis of amalgams for stopping teeth. They are sold in the form of filings or shavings containing from 40 to 60 per cent of silver, and are mixed with mercury immediately before application. The amalgam thus formed becomes a hard mass within a few hours. Small quantities of other metals, usually gold, platinum or copper, not exceeding 5 per cent, are occasionally added to the alloy in order to improve its quality.

Nessler's Reagent.

3512 Igbal Singh.—Asks how is Nessler's solution made ?

The solution may be prepared by stirring together a mixture of 33 gms. potassium iodide and 13 gms. mercury bichloride in 800 c.c. of water and boiling until a clear solution has been obtained. A cold saturated solution of mercury bichloride is now added drop by drop till the precipitate just ceases to redissolve ; 160 gms. caustic potash or 120 gms. caustic soda are now added along with a little of the bichloride solution and the liquid allowed to settle. The clear solution has a slightly yellow tint and on adding 2 c c. to 5 c.c. of water containing 0.05 m.gm. of ammonia must immediately show a yellowish-brown coloration. The reagent should be kept in small well-stoppered bottles.

Fehling's Solution.

The same gentleman asks how Fehling's solution is make.

Fehling's solution is prepared as follows : The purest copper sulphate is powdered slightly and exposed to the atmosphere for 12 hours, all dust being carefully excluded ; 34·63 gms. are now dissolved in 500 c c, of water. The alkaline tartrate solution should be freshly prepared as often as possible, and is formed by dissolving 173 gms. Rochelle salts in 400 c.c. of water and adding 100 c.c. of caustic soda solution containing 516 gms. per litre. Fehling's solution consists of equal proportions of these two solutions, and they should only be mixed for immediate use.

Pineapple Preserve.

3566 Paul V'Rayer—Asks how to preserve pineapple.

Take 1 pound of pineapple and 3/4 pound of sugar. Peel, core, and slice the fruit, place alternate layers of sugar and fruit in a bowl and allow to stand overnight. Next morning drain off the syrup and boil it for ten minutes, add the fruit and continue cooking fifteen minutes, remove from the fire, skim and pack into jars, process pint jars at 212°F for 15 minutes in a water-bath.

Mottled Soapr.

3448 S. D. Tangri. Requests us to describe the process of manufacturing mottled soap.

There are two distinct classes of mottled soaps, viz,, genuine mottled soap, in which the impurities from the raw materials used (principally insoluble metallic soaps) produce the mottling; and artificial mottled soap, in which the mottling is effected by the addition of copperas, ultramarine, or manganese dioxide, according to the colour of mottle required.

Genuine mottled soaps are generally prepared from low grade tallow, bone grease, or kitchen grease, with a cheap quality caustic soda, and are made by the boiling process, being pasted, grained, and then boiled with strong lye; but as soon as saponification is found to be complete, the boiling is continued with close. steam until the soap is just sufficiently open to mottle properly on cooling, this being a point which can only be determined by practical experience. When the right condition is reached, the soap is allowed to rest for an hour or two and then quickly run into wooden frames, and the frames covered with sacking in order to ensure slow cooling.

Artificial mottled soaps are made in different kinds and by various processes. A blue variety may be made by employing 40 per cent of coconut or palm kernel oil or a mixture of the two along with low grade tallow or bone-fat. bleached palm oil, and cotton seed or similar oil. When saponification has been completed, by whichever process is adopted the liquoring material is added to the soap, which should be distinctly alkaline. The liquoring material usually consists largely of silicate of soda solution, together with soda ash and brine, the composition and quantity added depending entirely on the nature of the fatty stock used in the soap. The mixture is thoroughly boiled with close steam until,, when a sample is withdrawn and tested, it is found to be in a suitable condition for adding the colouring matter, which for blue mottled soap, consists of ultramarine in the proportion of 3 to 3½ lbs. per ton. This may be either suspended in a small quantity of water or mixed up with a little of the soap, and sprinkled over the contents of the pan. The soap is then further boiled up until the colour is thoroughly distributed when it is run into wooden frames, and the frames covered to allow the soap to cool slowly.

Liquid Glycerine Soap.

3425 Roll 19007. Wants a recipe for a liquid glycerine soap.

Melt together 274 lbs. pale oleic acid 66 lbs. coconut oil, 228 lbs. caustic potash lye, 60° Tw., then add, boil up, and when saponified add 20 lbs. glycerine and enough methylated spirit to make the liquid clear.

Sugar Candy and Sugar Cube.

2879 W. C., Gauhati. Asks how sugar candy and sugar cubes are prepared ?

Sugar candy is nothing but sugar crystallised by leaving the saturated syrup in a warm place (90° to, 100°F), the shooting being promoted by placing sticks, or threads, at small distances from each other in the liquor ; it is also deposited from compound syrups, and does not seem to retain much of the foreign substances with which they are to be added. Brown sugar candy is prepared in this way from raw sugar; white sugar candy from a syrup of refined sugar which has been coloured red by means of cochineal.

Sugar cubes are obtained by a simple adaptation in the course of manufacture Moulds having the form of slabs are fitted in the centrifugal, so that the centrifugalled sugar there assumes the form of rectangular plates of the desired thickness These are after having been dried are cut in pieces by means of automatic shears.

Another form of cube sugar is made by pressing a mixture of very fine white sugar syrup in cube pieces by means of a drum with square openings through which the thick magma is pressed. The moist cubles are collected on a carrier and slowly transported through a hot air chamber from which they emerge quite dry and ready for sale.

Calcium Silicate.

3607 Harnam Singh Dhir. Writes 'can calcium silicate be prepared ?'

No definite hydrated silicate of lime (calcium silicate) has been obtained by the direct action of water on the anhydrous silicate. Calcium meta-silicate does not hydrate and the other calcium silicates when hydrated are at the same time de-composed, lime being liberated. The best process for obtaining hydrated silicate is the action of colloidal silica on lime water, when a very bulky precipitate is obtained ; one gramme of this substance in suspension in water occupies about two litres.

Contents of Fire Extinguishers.

3403. E Lakkaraju Naidu Wants to know the contents of fire extinguishers.

Different kinds of fire extinguishers contain different extinguishing compounds.

A typical recipe is

Carbonate of soda	8 lb
Alum	4 lb
Borax	3 lb
Carbonate of potash	1 lb
Silicate of soda	24 lb

When required for use 1½ lb. of this mixture is added to each gallon of water and throw over the fire.

In some cases the vessel is filled with water charged with carbonic acid gas under great pressure. It has also been found that water saturated with alum has superior values in extinguishing fires.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of INDUSTRY are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

3204 Illegible. Many recipes of dyeing textile appeared in December 1924 issue. For match making industry write to Bhawani Engineering and Trading Co., 122-1, Upper Circular Road, Calcutta. For industrial books write to Chackraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

3205 G. V. Subramanyam Chetty. An article on electroplating appeared in November, 1923 issue.

3206 Amjad Husi. Formula of bar soap similar to sunlight soap appeared in August, 1921 issue. Animal charcoal is charred animal dust. For the book required write to Butterworth & Co., Hastings Street, Calcutta. For wooden soap stamp write to M. L. Verma, Cawnpore.

3209 Beli Ram. Your enquiry is receiving our attention.

3212 Illegible. Recipes of lozenges appeared in October, 1922 issue.

3213 Rishanlal Ramjilal.—It is not possible to give the names and addresses of all of the match factories of India. But a few addresses follow :—Indian Match Works, Jagannaikpur, Cocanada ; Ananta Match Mnfg. Co., Nazibabad, U. P ; Sunderbon-Match Works, 12 Dalhousie Square, Calcutta ; National Match Factery, Canal East Road, Ultadanga, Calcutta and Star Match Factory, Lucknow.

3214 Vanka Satyanarayana—To secure suitable job advertise in the pages of news papers.

3216 Panchugopal Paul—Glass phials may be had of S K. Dey, 124 Shova Bazar Street and C. K. Das & Sons, 17 College Street ; both of Calcutta. To refine one pound of coconut oil or til oil use ¼ lb animal charcoal. For required capsules write to B. K. Paul & Co., 1-3 Bonfields Lane, Calcutta.

3217 Atul Kumar Nag—An article on the manufacture of picture frames appeared in August 1924 issue. For further particulars on the subject write direct to the writer of the article. As regards enquiry about the advertiser write him direct.

3218 Manohar Lall Bhatnagar—Hindi equivalents of gum tragacanth are anjira, layi. Gum tragacanth may be supplied by S N. De, P. O. Box 7851, Calcutta.

3219 Thakurdas & Hotchand Bros—For further particulars regarding photo picture on leather write to the Editor. The Leather World, 17-7 Bermondsey Street, London S. E. 1. An article on soda manufacture from *reh* will appear in an early issue.

3220 Mathura Prosad—Your enquiry about eight metalled ring is not in our line. Process of preparing enamel paints in general will appear in an early issue.

3221 Amerchand Laljee & Co.—Heiko refers to special brand of perfume.

3222 K. Metharam, P. O. Box 828, Cairo. For particulars regarding customs tariff write to Collector of Customs, Customs House, Calcutta.

3223 B. V. Naidu—For recipes of dyeing yarn please go through December, 1924 issue of INDUSTRY.

3224 P. Lakshmi Narayan—Scents may be had of Sikri & Co., 58-4 Canning Street, Calcutta. Glass phials may be had of Satya Charan Paul, 194 Old China Bazar Street, Calcutta. Alkanet roots may be bought of Bansidhar Dutt & Sons, 126 Khengraputty, Calcutta.

3225 M. Hriday Narayan—Wants to be put in touch with suppliers of ramie yarn and rings used in mantles.

3226 Gopal Singh Mehta—Amber, musk, etc may be had of Himalayan Stores, Kasauli Hill.

3227 Mookhia Ballabh Kant—For the required phials you may try Satya Charan Paul, 194 Old China Bazar Street and S K. Dey, 124 Shova Bazar Street ; both of Calcutta.

3232 D. E. Narote—You may write to The Philatelic Society of India, 15 Burrows Street, Bombay ; The Philatelic Journal of India, The Mall, Lahore ; The Philatelic Magazine, 87 Emmanuel Road, London S. W. 12 and The Calcutta Philatelic Mart, 46 Police Hospital Road, Calcutta. Your other query is in the nature of an advertisement.

3233 E Maung Maung—Process of preparing tea tablet appeared in July, 1923 issue.

3234 Po. Thaing—Do you mean to purify alum ? See note elsewhere.

3236 C. Nyden Can supply forest products.

3237 V. K, K. Menon.—An article on dry cell construction appeared in March, 1924.

3238 M. M Soldin.—We are unable to undertake your proposal.

3239 D. T. Mehta. Celluloid combs are made by Jessore Comb Works. For ox-gall try Smith Stanistreet & Co, Dalhousie Square, Calcutta. You can separate the oils by partial distillation but the process is attended with risk.

3241 Y. S. D. Sud. Spices, and sago, etc are exported by Amsterdam-Batavia Handelsvereeniging, Batavia and Apcar Ltd, Sourabaya ; both of Java. For coconuts enquire of Pragjee Jayaram Tanna and Ramchandra Mahadev & Co., both of Cochin. For books on business letter writing you may consult Wide World English Correspondence by K. M. Banerjee to be had of Industry Office, Book Dept, 22 Shambazar Bridge Road, Calcutta. Electrical goods may be supplied by McLawrie & Co, 17 Ezra Street and Mukherjee Bros & Co. 6A Balaram Ghosh Street, Shambazar ; both of Calcutta Soaps may be had on wholesale rate from William Gossage & Sons Ltd. Post Box 2303, Calcutta and M. Framrose & Co., 9 Bank Street, Fort, Bombay. For the required address write direct to the party. Wants to be put in touch with khaki cloth suppliers.

3242 Ramji Lal Kat Mohamed Khan. Sugar cannot possibly be recovered from spoilt jam.

3244 Chamarty Sitaramamoorthy. Process of extracting lemon oil will appear in an early issue.

3245 Monsiem Emile Kerjean. For the required information write direct to the party.

3246 C. R. D Sirgem For Ayurvedic appliances, etc. try B K. Paul & Co, 1-3 Bodfields Lane and Bengal Chemical & Pharmaceutical Works Ltd, 15 College Square ; both of Calcutta. Ayurvedic drugs may be bought of Dacca Sakti Ousbadhalaya, 82/1 Beadon Street, Calcutta.

3249 Raghubir Singh. Ghee may be had of Durga Charan Rukshit, Cotton Street, Calcutta,

3250 B. Sen Gupta. Formula of pain balm will be found in December, 1922 issue of INDUSTRY. Formula of washing soap appeared in May, 1924 issue. Formula of floating soap will be found in January, 1925 issue. It is not possible to manufacture soap at so cheap cost One minute cameras, may be supplied by E. Solomon, 3, Kenderdine Lane, Calcutta

3251 Jugaldas. For ivory enquire of K. N. Lawyer, 23, Canning, Steet, Calcutta.

3252 K. P., Menon. For industrial books write to Chakraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

3255 Mohan Singh. For artificial eyes write to Carves Artificial Limb Co. Kansas City, Missourie and A. S. Mark, New York ; both of U. S A You may also enquire of B. K, Paul & Co , 1-3, Bonfields Lane, Calcutta.

3258 V. A., Venkataram. For books on photography write to Thacker Spink & Co, 3, Esplanade East, Calcutta.

3259 D. Mukherjee. An article on boot polish manufacture appeared in June, 1923 issue. For industrial books write to Messrs Chakraverty Chatterjee & Co. Ltd., 15, College Square and Thacker Spink & Co., 3, Esplanade East ; both of Calcutta.

3260 Sita Ram Kohli. Palm oil and palm stearine may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. Wants to buy cotton stearine and colloidal clay in large quantity.

3263 Dawarkadas. For munj string making machines try Oriental Machinery Supply Agency Ltd., 20-1, Lall Bazar Street, Calcutta.

3264 Syed Amir Husain. Indian Poultry Gazette, Sperrin Retreat, Simla S. W. will serve your purpose.

3265 G. H. Oppal. Formula of sacchrine will be found in June, 1923 issue.

3266 R. Ihesha Raja. Recipes of pomade will be found in Setember, 1924 issue. Formula of soap appeared in May, 1924 issue.

3267 Hanumantha. All the recipes of December issue produce fast colour.

3269 Lakshman Gundo. The preparation of plasters is simply a process of dehydration of gypsum by heat. The heat applied should be 190°C.

3270 L. S. Kalyan. Yes, there is arrangement for learning radio operation. You may write to the Principal, College of Wireless Telegraphy, Wireless House, 12, Chowringhee, Calcutta. For licence for importing radio instrument write to the Director of Post and Telegraph, Wireless Dept, Delhi.

3271 Bindeswari Prasad. For oil and flour mills write to Burn & Co., 7, Hastings Street, Calcutta.

3272 Kalava Sanjeeva Chetty. For looms write to Bros. Partner, 35, Egra Street and B. D. Bery & Co., 43, Ripon Street ; both of Calcutta.

3273 Satyanaryan Cigar Works. *Arhar chuni* is the name for small particles of *arhar*.

3274 Vanmali Dyyabhir Deshi. For the required tools write to T. E. Thomson & Co. Ltd., 9, Esplanade East, Calcutta.

3276 K. Venugopalam. Please write to the party for full particular.

3278 Bireswar Sen Gupta. Preparing tartaric acid from tamarind is a complex process involving many technicalities. Your other queries have already been replied.

3279 Dwarka Prasad. Wants to be put in touch with spice dealers of Ceylon, Singapore and Cochin.

3282 A. R. Chatterjee. Formula of bleaching powder will be found in November, 1922 issue.

3283 Maung Ba Po. For pictures write to A. Remnofeld, Berlin S. W. 68 and Trau & Schwab, Dresden A19 ; both of Germany.

3284 Md. Abdul Majeed. Pebbles may be bought of Stephens & Co. Ltd., 375, Bow Bazar Street, Calcutta. There is no arrangement for learning eye-testing by correspondence. Either you will have to read medical science or serve as an apprentice in a spectacless dealer's shop.

3285 Sawaya Ram. Write direct to the advertiser.

3286 Tara Chand. Stationery articles may be supplied by Nilmoney Halder & Sons, 106, Radha Bazar Street and Dass & Co, 60, Sikdar Bagan Street ; both of Calcutta.

3287 Gopal Lal Sethi. For pearl and mother-of-pearl write to Dalton & Young, 38, Fenchurch Street, London E. C. 3. Needles may be supplied by supplied by Crescent Manufacturing Co., 25 & 27, Fann Street E. C. 1 and James John & Sons Ltd., 80, Wood Street, E. C. 2; both of London. Piece-goods may be supplied by C. Framji & Co., 14, Hummum Street, Bombay. R. K. Motishaw & Co., 11, Hummum Street, Bombay; Haribux Durga Prasad 61, Cross Street, Calcutta and Lalchand

Bhojraj, Govardhandas Cloth Market, Karachi.

3288 Raymard Vaz. The following are a few of the tanneries of Calcutta and Cawnpore: (1) Bengal Leather Mfg. Co., 9, Sreenath Das Lane, Calcutta; (2) Patna Tanneries Ltd., 2-1, Mission Row, Calcutta; (3) United Provinces Tannery Co, Jajmow, Cawnpore and (4) Moolchand Leather Factory, Misri Bazar, Cawnpore. Talking machines are supplied by T. E. Bevan & Co. Ltd, 21, Old Court House Street, Calcutta; Gramophone Co. Ltd., 139, Belliaghata Main Road, Calcutta and Bombay Phono & General Agency, 11, 12, Kalbadevi Road, Bombay. For jewellers' tools write to A. J. Soor & Co., 233, Upper Chitpur Road, Baghbazar, Calcutta. Cycles may be bought of S. N Bhattacherjee & Sons, 5, Dharamtala Street and G. Rogers & Co., 23, Lall Bazar Street; both of Calcutta.

3289 M. C, Chettiah. For blocks of required design write to the Calcutta Chromotype Co., 52-3, Bow Bazar St, Calcutta. Stationery articles may be supplied by Dass & Co., 60, Sikdar Bagan Street, Calcutta. You may put your advertisement in Kelly's World Directory published by Kelley's Directories Ltd., 182-84, High Holborn, London W. C.

3290 H. M. A. Karim. For technical books enquire of Chakraverty Chatterjee & Co. Ltd., 15, College Square and Thacker Spink & Co., 3, Esplanade East; both of Calcutta.

3293 Behari Lal Joshi. Yes, all the dyeing recipes published in December issue will produce fast colours. Please write clearly whether you require Hindi enquivalent of all ingredients used in the recipes.

3294 Ghafur Ahmed. Process of preparing crayons appeared in February, 1925 issue.

3295 Gopal Rao. Please refer your query to Sushruta Sangha, 177, Raja Dinendra Street, Calcutta.

3296 N. Hoshang. Wants to be put in touch with suppliers of blue cotton piece-goods known as guinea-cloth.

3298 M. S. Saini. For oil engine enquiries may be made of B. D. Bery & Co., 43, Ripon St, Calcutta. Cardboard box making machine may be supplied by Oriental Machinery Supply Agency Ltd., 20-1, Lall Bazar Street, Calcutta. Try to secure other implements locally.

3300 C. C. Shah. For analysis of chemicals write to R. V. Briggs, 8, Lall Bazar Street, Calcutta. Other enquiry is receiving our attention.

3302 Pt. Shama Rao. For map printing write to Sashi Bhusan Chatterjee, 8, Dixon Lane, Calcutta. For other queries see elsewhere in this issue.

3303 Williamson Bros. For cigarettes of required brand write to Karim Bux & Elahie Bux Bros., 58-4, Canning Street, Calcutta.

3307 M. P. Bhattacherya. For engraver's tools write to A. J. Soor & Co., 233, Upper Chitpur Road, Baghbazar, Calcutta. Try to secure box wood locally.

3308 R. S. B. Sing. Eye glasses may be had of Stephens & Co. Ltd., 275, Bow Bazar Street, Calcutta. For books on eye-testing write to Butterworth & Co., 8, Hastings Street, Calcutta. For mechanical books enquire of Thacker Spink & Co, 3, Esplanade East, Calcutta.

3309 R. S. Atmaram's Sons. For vegetable oils enquire of Panchkari Tat & Sons, 6, Mirbahar Ghat Street, Barabazar and M. P. Shaw & Co., Umed Bhagwan Bldg., 115, Bhoiwada 3rd Lane, Bombay.

3310 R. S. Bhatt. Yes, you may prepare inkstand, etc. Use naphthalene to prevent the woollen goods being eaten up by worms or moths.

3311 K. Chaturbhuj Sharma. For cinema machines and films write to Madan Theatres Ltd., 5, Dharamtala Street, Calcutta.

3312 H. Kuppusing. Your enquiry is engaging our attention.

3313 The Bhola Nath Soap Factory. An article on candle making appeared in December, 1922 issue. Candle making apparatuses may be supplied by Calcutta Industries Ltd., 71, Canning Street, Calcutta.

3315 Satish Ch. Ghosh. Wants to know the name of inventor of safety-pins.

3316 Bhag Singh. To communicate with any querist write him quoting the number and initials under care of INDUSTRY when your letter will be duly redirected.

3317 A. Narayana Iyer. Envelope making machines may be bought of Oriental Machinery Supply Agency Ltd., 20-1, Lall Bazar Street, Calcutta. For hand printing machine write to Ashutosh & Co., 16, Lower Chitpur Road, Calcutta.

3318 Bepin Behari Paul. Recipe of hair dye will be found in January, 1925 issue of INDUSTRY.

3319 Jaswant Rai Ramta. It is not possible to alter the property of same material; you may try plaster of paris for coating.

3320 G. N. Chaudhuri. For ice making plant try Alex Brault, 6A, Wellesley Place and Burn & Co., 7, Hastings Street; both of Calcutta.

3321 S. K. Srivastava. An article on match manufacture appeared in July, 1922 issue.

3323 K. V. S Nath. For labels of required design write to The Imperial Litho & Tin Printing Works, 1-2, Mechuabazar Street, Calcutta.

3324 A. Kader. For appearing in the examination in homeopathy write to the Principal, The Chicago College of Homeopathy, 89, Shambazar Street, Calcutta.

3325 K. Venkaih. An article on boot polish manufacture appeared in June, 1923 issue of INDUSTRY. For watch parts write to Abrecht & Co., 17 & 18, Radhabazar Street, Calcutta and Esoofally Hiptolla & Co., 10, Rhadhabazar Street, Calcutta.

3326 P. Krinhnasami. Recipes of bread and biscuits appeared in February, 1925 issue of INDUSTRY. Formula of sealing wax will be found in November, 1921 issue. Please have the ragi corn analysed.

3327 K. Appoo Mistry. Please refer your query to the Director of Industries, Burma.

3328 N. Subbiah Thaver. At least Rs. 25,000 will be required for starting a cardboard manufacturing factory. Yes, there is good market for cardboard in India Bengal Paste Board & Paper Mills Ltd., 8, Old Court House Corner, Calcutta manufacture cardboard. For cardboard manufacturing machines write to T. J Marshall & Co. Ltd., Belfast Rd., Stoke Newington, London N. 16 and Vickery's Ltd, Devonshire Grove, London S. E. 15.

3329 Jan Mohamed. Soap stamping moulds may be bought of C. S. Sircar, 86A, Narkeldanga North Road, Calcutta. Candle making apparatus may be supplied by Calcutta Industries Ltd., 71, Canning Street, Calcutta.

3330 S. C. Juha. You may use hydro-extractor which may be supplied by Duncan Brothers, 101 Clive Street, Calcutta.

3331 Abdul Aziz Qureshy. The full address of Export and Import Review is 38 39 Krausenstrasse, Berlin, Germany.

3332 Kishan Chand Sharma. Piece-goods may be supplied by Edmonds Thomas, Eastern House, Bradford, England and Alfred Young & Co. Ltd., 29 Round Lane, London E.C. 3. Woollen shawls are manufactured by Adolf Dabel & Co. Brunnenstrasse 181, Berlin No. 54, Germany and Sussmann & Wiesenthal, Hagelbergerstrasse 53-54. Berlin, Germany. Your other query is not in our line.

3333 B. Gangiah. For flour machine write to Burns & Co., 7 Hastings Street, Calcutta.

3335 Bhagavan Chetty & Co. Picture frame mouldings may be supplied by Gost & Co., Han Alexanderinenstrasse 105-106 Berlin S. W and Koppe

& Schreiber, Adaltbertstrasse 9, Berlin, S. O ; both of Germany.

3338 Martand Trading Agency. Tracing cloth may be bought of Nilmoney Halder & Sons, 106 Radhabazar Street, Calcutta. Photographic films may be bought of Kodak Camera Ltd, Chowringhee, Calcutta. For socks write to E. B. Bros & Co, 11 Dharamtala Street, Calcutta.

3347 J. H. Sarcar. The Superintendent of Hogg Stuart Market, Calcutta may introduce you to fowl dealers.

3348 R. G. Dadina. Astrological books may be bought of Chirological Society, 54 Amherst Row, Calcutta.

3340 Jwalaprashad Sock making machines may be had of Economic Mills Ltd, 55-2 Dharamtala Street, Calcutta Yarn and needles may be supplied by E B. Bros & Co, 11 Dharamtala Street, Calcutta.

3351 Sitaram Jain. Addresses of foreign as well as Indian piece-goods merchants appear elsewhere in these columns.

3353 Sorab R. Ginwala. To engage agents advertise in pages of newspapers and periodicals.

3356 D. R Bodhankar Chemicals may be had of B. K. Paul & Co., 1-3 Bonfields Lane, Calcutta. Minerals may be supplied by Calcutta Mineral Supply Agency, 31 Jackson Lane, Calcutta. Only book knowledge will not do, you will have to acquire some practical experience.

3357 D. D. Kapur. Your query appeared in the last issue.

3363 P B Mohan & Bros. For industrial and technical books write to Chakraverty Chatterjee & Co. Ltd, 15 College Square and Thacker Spink & Co., 3 Esplanade East ; both of Calcutta.

3364 S. K. Ghosh. For poultry you may go through works on the subject. For books vide above.

3365 Fateh Chand. For jute mill machinery write to A. Blinston & Son, 209 Copster Hill Road, Oldham and A. Duncan & Sons, 30 Hiltown, Dundee.

3366 Syed Abdur Razzack & Co. For German match making write to Mr. A. P. Ghosh, 42 Beniapukur Lane, Entally, Calcutta.

3367 Sharma Bros. & Co. For hessian write to Lalsahai Krishnan Lall & Co., 102, Cotton Street and Sewdeyal Ranjitdas, 124. Canning Street ; both of Calcutta. Window glasses may be supplied by Fatic Lall Seal & Sons, 16, Swallow Lane and Hem Chandra Chunder, 13, Swallow Lane ; both of Calcutta. Glass phials may be supplied by S. K. Dey, 121, Shova Bazar Street and Satya Charan Paul, 194, Old Chinabazar Street ; both of Calcutta.

3372 Phool Chand. For patent medicines enquire of Engal Apotheke, Kanorierstrasse 4, Berlin, Germany ; Victoria Apotheke, Friedrichstrasse 19, Berlin, Germany ; Kachurin Drug Co., New York, U. S. A. ; United Drug Co., Boston, Massachusetts, U.S.A.; Namzen Yakuten, 52, Nichome, Doshomachi, Osaka and Shionogi & Co. Ltd., 12, Sanchome, Dosheemachi, Osaka, Japan. For other queries consult a physician.

3373 Roaranchand. Wants to know the address of the agent of Burma Co's. watches in India.

3374 Dina Nath. For button making you are referred to Mr. M. M. Ghosh, 20-1, Lall Bazar St., Calcutta.

3375 M. Raman. Please consult a physician.

3376 Seemakur Venkata Gunnayya. Write to the Consul-General for Japan, 7, Loudon Street,, Calcutta for match splint and veneer supplier's address.

3377 S. Natarajan. Please go through wanted columns of daily papers and apply for suitable job. For learning mechanical engineering write to the Principal, Bengal Technical Institute, Jadabpur, Ballygunge, Calcutta.

3380 Jit Narayan. Formulas of tooth paste appeared in last April issue. Recipe of office paste appears elsewhere in this issue.

3381 D. R. Dave. Collapsible tubes may be supplied by A. H. Wirz Inc. Chester, Pennsylvania and Peerless

Tube Co., 37, Locust Avenue, Bloomfield, New Jersey ; both of U.S.A.

3382 A. Somasekharam & Sons. Yarns may be supplied by C. Framji & Co., 14, Hummum Street, Bombay ; K. Haridas & Co., 30-36, Parsi Bazar St, Fort, Bombay; Adamjee Hajee Dawood & Co., 55, Canning Street, Calcutta and Chettlebalt & Co, Ltd, 9-10, Moor St., Madras. You may go through Commercial America, 34th St., Below Spruce, Philadelphia ; Pacific Ports, Los Angelos and Chicago Commerce, The Chicago Association of Commerce, Chicago ; all of U. S. A.

3383 Virbhandas Jumain Library. Almost all the address you require will be found in these columns and in the advertising pages of INDUSTRY.

3386 Meherji M. Dastoor & Co. Tablet making machines may be supplied by Calcutta Industries Ltd, 71, Canning Street, Calcutta.

3387 K. M. Das. Further particulars of the premium bonds, referred to by you, are not known.

3389 Hebbar Math. Use potassium hydroxide in hair lotion. Refer your other query to the Manager.

3391 K. L. Dhami. The export of peacock feather is prohibited under customs laws. Wants to be put in touch with suppliers of peacock feathers in Calcutta.

3392 S. Barnabas. Bones are mostly used as manures and bone charcoals are used in refining sugar. Hence you may try tea plantation and rubber plantation for disposing of bones.

3393 Sarat Chandra Bhattacharyya. For myrobalan extract try S. N. De. Post Box, 7851, Calcutta. Use gum arabic in very small quantity. For, small cinema machines write to Madan Theatres Ltd, 5, Dharamtola Street, Calcutta.

3394 Avadhnandan. For cameras try Calcutta Camera House, Chowringhee, Calcutta.

3395 Umashankar Shivastava. Refer to No. 3386 above.

3396 R. V. Vaidya. Stationery articles may be bought of P. Gandy & Co., 10-14, Parsi Bazar St, Bombay ; Bombay Stationery Mart, Victoria Bldg., Parsi Bazar Street, Bombay ; Nilmoney Halder & Sons, 106, Radha Bazar Street, Calcutta, and P. L. Madam & Co, Chandni Chowk, Delhi. Chalk crayons may be had of Agra Pencil Factory, Agra. Plaster of paris may be supplied by Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta.

3397 P. M. Joseph. For cameras required write to Eastman Kodak Co., of New Jersey, Rochester, New York, U. S. A. ; G. Cramer Dry Plate Co., St. Lous, Moussourie, U. S. A. and Cameragraph Co, Ltd., 45, Kingsway, London. W. C. 2.

3398 Janki Prasad. Thank you for your valuable suggestion.

3399 Hajee Abdul Wahid. The required address is not known to us.

3401 Bhuban Mohan Rai. Process of preparing artificial slate will appear in an early issue.

3402 S. C. Sivarama Krishnapillay. Refer your query to Chilean Nitrate Committee, Post Box 469, Calcutta.

3405 K. Palamivelu Pillai. For crown corks apply to P. S. Dutt & Bros. 8, Ezra Street, Calcutta.

3406 E. Maung Maung. Your queries have already been replied.

3408 Shanker Gir Karyalaya. Theatrical goods may be had of Kunja Lal Pal, 318, Upper Chitpur Road and Atul Chandra Pathak, 118, Upper Chitpur Road ; both of Calcutta. Your other query is not in our line.

3409 J. H. Sarcar. You may go through Indian Agricultural Magazine to be had of Thacker Spink & Co., 3, Esplanade East, Calcutta. For pure khaddar write to Khadi Pratisthan, 15, College Square, Calcutta.

3410 M. R. Krishna Rao & Co. Refer your query to the Bombay Mill Owners' Association, 50 Grahams Bldgs, Parsi Bazar Street, Bombay.

3411 Rupsing Devisingh & Co. All the chemicals you refer to are manufactured from coal. But all of these are not manufactured on commercial scale in India. Acetic acid may be bought of The Calcutta Chemical Co., Ltd., 35-1, Panditia Road, Ballygunge, Calcutta and East India Chemical Work Co., 5, Mission Row, Calcutta. Perfumes may be supplied by Schimmel & Co., Miltitz bei Leipzig and Heine & Co., A.—G, Leipzig, U Groba; both of Germany.

3413 R. Krishna & Co. For Calcutta sweep ticket please go through the advertising pages of January 1925 issue of INDUSTRY.

3417 K. S. V. Nath. A good recipe of fountain pen ink appeared in August 1924 issue. Process of glazing earthenware appeared in September 1921 issue. Nigrosine may be bought of Aminchand Mehra & Sons, 34, Armenian Street, Calcutta. Dextrine may be supplied by Crystal Works, 67, Durga Charan Mitter Street, Calcutta.

3421 M. S. & Co., For machine write to Taylor and Challen Ltd., Birmingham, England. No such journal is known to us. Wants to be put in touch with ghee dealers of Europe.

3422 B. K. Lall. Refer your first query to the company direct. Oil engines may be had of B. D. Bery & Co., 43, Ripon Street, and Alfred Herbert Ltd., 13, British Indian Street; both of Calcutta.

3424 H. C. Chettiah. For sarsaparilla root enquire of S. N. De, Post Box 7851, Calcutta and Banshidhar Dutt & Sons, 126, Khangraputty, Calcutta.

3426 Dhirajlal Uttamram Megha. Yes, you may use that thread as boot lace and candle wick.

3427 J. S. Gonsalvis. Mysteries of Nature may be bought of Durjodhan's Herbal Home, Post Box 11416, Calcutta at Rs. 4 each.

3428. A. Bakshy & Sons. Oil engines may be bought of B. D. Berry & Co., 43, Ripon Street and Alfred Herbert Ltd., 13, British Indian Street; both of Calcutta.

3429 C. Ram. Magical apparatuses may be supplied by the Magical Co., Jhansi; Magic House, Nagpur City and R. C. Verma, P. O. Mohendru, Patna.

3430 Nibalchand Ranchhod Gandhi. Your queries are not feasible.

3431 Bhagat Ram. Galvanized sheets may be bought of Anandji Haridas, 20, Darmahatta Street, Calcutta. For the required machine try Oriental Machinery Supply Agency Ltd, 20-1, Lall Bazar Street, Calcutta.

3434 Kishen Narain Amen. For industrial books write to Chakraverty Chatterjee & Co, Ltd., 15, College Square, and Thacker Spink & Co., 3, Esplanade East; both of Calcutta. Use edible colours.

3436 Suresh Chandra Guha. You may drive machine by wind power or water power. Wants to be put in touch with wholesale dealers of vermicelli.

3437 Behramji Baryorji Daji. To communicate with any querist write him with name and number under care of INDUSTRY when your letters will be duly redirected.

3438 M. Soleman. The Imperial Litho and Tin Printing Works, 1-2, Machua Bazar Street, Calcutta may print beautiful labels.

3440 Akhil Chandra Acharyya. Formula of washing soap appeared in May, 1924 issue of INDUSTRY.

3441 Durga Dayal. Formula of artificial gold appeared in July 1923 issue. Other formulas will appear in an early issue.

Bombay Deshi Oushadhalaya.

Factory & Dispensary.

ASK FOR ANY FEVER

AGUE KILLER.

1 Phial as. 8. Doz. Rs. 5.

and our other popular remedies. Can be had everywhere at Cheapest Rate.

PEARL & CO., Victoria Garden,

BOMBAY.

3442 Modern Chemical Works. All the articles mentioned by you are foreign herbs mostly imported from abroad and used in medicine. Hence their Hindi equivalents are not known. Formulas of lime juice and soda will appear in an early issue.

3443 S. M. Azizudeen & Bros. Plumbago may be bought of Chowdhury & Co., 71P, Clive Street and D. N. Ghosh & Son, 71, Clive Street ; both of Calcutta. Enamelled sign plates may be supplied by Gobekaja Dolls & Toy Co., 81-1, Baranashi Ghosh Street and Bengal Enamel Works Ltd, 55, Canning Street ; both of Calcutta.

3444 S. Palaniappa. Almost all the chemicals used in match industry are imported.

3445 Fazlehuseein & Brothers. Write direct to the party. See No. 3437 above.

3446 Kedarnath Agarwal. An article on knitting socks appears elsewhere in this issue.

3450 D. G. Tikali. Process of preparing potash from wood ash is a costly one and it will not be profitable.

3451 Thakur Dhar Singh. For wooden blocks for printing designs on cloths write to the wood engravers of your locality. Or you may communicate with Mankema Bros, 151, Kalbadevi, P. O. Bombay.

3452 Pandit Sham Rao. For ferro-prussiate papers write to Bengal Miscellany Co., Ltd, 99, Manicktala Main Road, Calcutta. To prepare cures for scorpion bites you are referred to physicians. The exact recipe of Kesaranjan oil is not known.

3453 V. V. Shan Karam. Please enquire of the publishers of the book.

3454 Sayed Irshad Ahmed. Desires to be put in touch with buyers of bones. Bonemeal is used as a manure.

3455 P. L. Bakliwal & Sons. Communicate direct with the party addressing it by name and number under care of INDUSTRY when the letter will be duly redirected.

3456 Gatulal P. Pathak. Wants to purchase materials for Artesan wells.

3457 M. Ibrahim. The following are a few of the tile manufacturers in India : Madras Brick and Tile Works, Konnur Road, Porambur ; Coronation Tile Works, Bular, Mangalore ; Adhikary Bros., Murshidabad.

3458 P. Maiti. Desires to know the address of dealers in Kush Kush Tat.

3462 Sir Ganga Ram Business Bureau and Library. For markets as regards castor seed you are referred to an article on the subject which appeared in the July, 1923 issue of COMMERCIAL INDIA.

3463 Krishna Medical Hall. Method of preparing sugar of milk appeared in the last issue of INDUSTRY. For ringworm powders consult physicians. Recipes for single black hair dye powder refer to December, 1924 issue.

3465 New Sewing Machine Co. Sewing machines may be had of the following Indian and German firms : Singer Sewing Machine Co., E 2, Clive Bldgs, 8, Clive Street, Calcutta ; H. Ahlers & Berg, Kiel, Germany ; Hermann Bever & Co., Karlstrasse 24, Karlsruhe, Germany.

3468 P. R. Singh. For chemicals try Day Charles & Co., Albion Works, Caxton Road, Tottenham, England. Essences may be purchased of J. Lamotte, rue Vacon, 22, Marseilles.

3470 Vishwa Karma Mills Ltd. You are referred to COMMERCIAL INDIA.

CHEAPEST HOUSE FOR
Sporting Goods
Silver Medals, Cups & Shields.
Fine Silver Medals in Velvet lined cases.
Rs. 3-12 each.
Largest Stock & Variety
Illustrated lists free.
CARR & MAHALANOBIS,
Chowringhee Corner, Calcutta.

a sister journal to INDUSTRY published from this office for information regarding money market.

3471 D. A. Kavade. Write to the dealers of picture post cards, etc. a list of addresses of which appeared in the April and June 1923 issues of COMMERCIAL INDIA. 'Here are a few German, English and American manufacturers of Cameras : Conby Camera Co, Rochester Minn, U.S.A. ; W. J. Thompson & Co., 615, W. 43rd Street, New York City, U.S A. ; Ernemann Werke, H. G. Dresden 112, Germany ; John J. Griffith Sons Ltd., Kemble Street, Kingsway London, W. C. 2.

3472 Ainjad Hussain. For books on salesmanship write to Messrs Chakraverty Chatterjee & Co., 15, College Square, Calcutta. Soap nut may be bought of Banshidhor Dutt & Sons, 126, Khangraputty Street, Calcutta. Recipe of soft solder will appear in an early issue of INDUSTRY. For recipes of soaps try the recipes given in August, 1921. Rights of publishing new ideas are reserved.

3473 Bachoo Hossain Sait. Watch materials may be had of the following firms in Switzerland, Weber and Fluck, Soleure and S. A. Sauser, Soleure.

3474 M. R. H., Crosswell. For German addresses of steel frame wooden houses write to the Information Service Department, Import and Export Review, Krausenstrasse 38, Berlin Germany.

3476 Mukundu S. Nagasami Iyer & Co. Comb-making machine may be bought of Calcutta Industries Ltd., 71, Canning Street, Calcutta.

3477 A. V. Raja Rao. Wooden boxes are manufactured by A. Krishmann & Co , 6, Gauribarea Lane, Shambazar, Calcutta.

3478 Sarat Chandra Dass. No such book is known to us.

3482 S. C., Ghosh. Chemicals may be bought of B. K Paul & Co., 1-3, Bonfields Lane, Calcutta ; British Medical Hall, 95, Sadar Bazar, Lucknow ; English Medical Stores, 61-67, Sadar Street and Jaitby & Co , 23, Saigalpura, Muttra. Dyes may be supplied by Aminchand Mehra & Sons, 34, Armenian Street, Calcutta. Java sugar may be supplied by Bird & Co., Meston Road, Cawnpore ; Seth Purushotam Das Nandun Prasad, Alamgiriganj, Bareilly and Sheo Nandan Lal Tewari, Couperganj, Cawnpore. Other addresses you require will be found in these columns.

3484 R. S., Atmaram's Sons. Your query appears elsewhere in these columus.

3485 E. Maung Maung. For shirt labels write to E. B. Bros., & Co., 11, Dharamtala Street, Calcutta and The Shelton Tack Co., Shelton, Connecticut, U. S. A.

3486 M. O., Chettiah. Electroplating outfits may be supplied by T. E. Thomson & Co , 9, Esplanade East, Calcutta. They will supply you the instruction. You may use Thacker's Indian Directory. An article on soyabean will appear in an early issue.

3491 Mothay Krishna Rao. Wants to be put in touch with coconut merchants of Rangoon.

3492 Jesaram Mansaram. For the address of the sole agent write to the firm direct.

3494 Hari Ram. Soap.stone is used in soap as an adulterant.

3496 Rajendra Brothers. Refer your query to ship-owners of India such as Mackinnon Mackenzie & Co., 16, Strand Road and Turner Morrison & Co. Ltd., 4, Council House Street; both of Calcutta.

A SURE REMEDY
SHINDE BROS.,
AGUE MIXTURE
FOR
ALL MALARIAL FEVERS.
AGENTS WANTED EVERYWHERE.
Special Terms to Merchants.
Apply to :—
SHINDE BROTHERS,
Shinde Bldg. De Lisle Road, Bombay 11.

3497 Jan Mohamed. Essences may be had of P. Mukherjee & Co., 28-29, College Street Market, Calcutta. Lozenge making machines may be supplied by Oriental Machinery Supply Agency Ltd., 20-1, Lall Bazar St., Calcutta. Formula of lozenges will be found in September, 1922 issue of INDUSTRY. For industrial books try Thacker Spink & Co., 3, Esplanade East, Calcutta. Formula of vinegar appeared in January, 1924 issue.

3498 Williamson & Co. Want to be put in touch with managanese ore proprietors of Dewalgaon, Singhbhum and Manbhum. Vide No. 3437 above.

3500 Bepin Chandra Bitwas. Gypsum and felspar may be supplied by Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta and Williamson & Co., Oldham Road, Gaya. Asbestos may be bought of J. C. Kundoo & Co., 36, Raja Woodmunt Street and Marine & Engineering Store Co., 97, Clive Street ; both of Calcutta. Soapstone may be had of Tularam Nathuram, 180, Harrison Road and Jagadish Agarwall, 26-1, Grey Street ; both of Calcutta.

3504 Kashmir Bhawani Trading Co. Refer your query to Kodak Ltd., Chowringhee and Madan Theatres Ltd., 5, Dharamtala Street ; of Calcutta.

3505 S. K. S. Brother. Process of softening rubber appeared in July, 1923 issue. For the required machine try Alfred Herbert Ltd., 13, British Indian Street, Calcutta.

3506 B. C., Gam & Son. For starting business with small capital please go through New Idea columns of INDUSTRY. Butter making machines may be supplied by P. Lodge & Co, Post Box 6772 and Oriental Machinery Supply Agency Ltd., 20-1, Lall Bazar Street ; both of Calcutta.

3507 Malook Singh. Picture post cards may be supplied by Tuck Raphel & Sons Ltd., Raphel House, Moorfields London E. C. 2 ; City Post Card Co., 42, Mansell Street, London E. 1 ; E. David, Cite. Rougement 8, Paris ; P. J. Gallais & Cie, Rue Vegnon 38, Paris; Photochemic G. m. b. H, Stolpischestrasse 37, Berlin, Germany, Rommier and Jonas G. m. b. H., Blasewitzerstrasse 27, Dresden, Germany and Cramer Beda, Kungsg 56, Gothenburg, Sweden. The above firms may also supply the required picture glasses.

3508 D. N., Borgaonker. If you go through the Sale & Exchange pages of INDUSTRY you will find addresses of a number of firms wishing to represent their goods in different markets of India.

3509 S. B, Sali & Co. For cycles and typewriters write to C. Rogers & Co, 13, Lall Bazar Street, Calcutta. Printing machines may be supplied by K. Banerjea, 133, Canning Street and Ashutosh Auddy & Co., 16, Lower Chitpur Road ; both of Calcutta. For calendars see No. 3507. C. i. f. quotation includes cost, insurance and freight.

3511 J. M. Yacoob. Turmeric powder is used as colour. Process of extracting lemon oil from lemon peel will appear in an early issue. Perfumes and essences may be bought of S. Paul, 4, Hospital Lane, Dharamtala and P. Mukherjee & Co., 28-29, College Street Market ; both of Calcutta.

3514 D. Gopalaswami Pillai. For pictures and picture frames try Roy Babajee & Co., 182, Lower Chitpur Road, Calcutta and Star Art Framing Works, 40, Medows Street, Fort, Bombay. Glass sheets may be bought of

Soap & Perfume Manufacturers.

FREE -- Samples of perfumes for above trade will be sent on receipt of the inquiries from bonafide manufacturers. Excellent qualities of the highest strength.

PRICES LOWEST.

Write for Samples to-day—

Anglo-Indian Drugs & Chemical Co.,
No. 155, Juma Musjid Circle,
P.O. Box 2082, Bombay.

Hemchunder Chandra, 13, Swallow Lane and Fotic Lall Seal & Sons, 10, Swallow Lane; both of Calcutta. Make a paste of plaster of paris and put them on wooden moulds of required design. Other addresses will be found elsewhere in these columns.

3516 N. J. Shukla. See No. 2968 in February issue of INDUSTRY under Brief Query column.

3517 R. C, Patel. There are many tea estates in India, hence it is not possible to give all the addresses, some of them follow : (1) Mornai Tea Estate, Din Dirga, Goalpara, Assam ; (2) Mothola Tea Co. Ltd., Mothola, Dibrugarh, Lakhimpur ; (3) Risheehat Tea Co. Ltd , Ghoom, Darjeeling and (4) Banarhat Tea Co. Ltd., Banarhat, B. D. Ry. For complete list consult Thacker's Indian Directory to be had of Thacker Spink & Co , 3, Esplanade East, Calcutta. Tea may be bought of Bhattacharya & Co., 1, Swallow Lane and Boloma Tea Co., 226, Bow Bazar St., ; both of Calcutta.

3518 K. C. Augier. Under ordinary circumstances and without the help of machinery the gases you have mentioned cannot be liquefied.

3519 Bhojraj Maloomal & Co. The following firms of Srinagar, Kashmir export woollen goods : (1) Dinanath Diwanchand, 1st Bridge ; (2) The Kashmir Stores and (3) Rasool Hajee & Sons, 2nd Bridge.

3520 Sri Ram Poplai. In veiew of the cheap imported chemicals it will not be advisable to start a chemical industry now. Formula of printing ink appeared in February, 1923 issue. An article on phenyle manufacture will be found in October, 1921 issue.

3521 Aziz D. Ahmed. For crepe rubber soles write to The Perfect Rubber Co., Mansfield, Ohio, U. S. A.

3522 Amrit Lal Puri. For appliences used in laundry write to Pioneer Mail Supply Co., 93-3, Clive Street, Calcutta.

3523 Kakkirala Samanna & Sons. Refer to No. 3437 above.'

3525 M. F. Rahman Shah & Co. Write to Consul-General for Germany, 2, Store Road, Ballygunge, Calcutta.

3526 K. Bhagirow. Formulas of essences, foams, etc. will appear in an early issue.

3527 Illegible. Refer your query to the Manager, Tata Iron Works, Jamshedpur.

3529 H. T. Husain Hilmy. Cements are manufactured by Dwarka Cement Co. Ltd., 6, Hummum Street, Fort, Bombay ; Katni Cement & Industrial Co. Ltd., Katni and Reliance Trading Agency Co., 2, British Indian Street, Calcutta

3531 B. Dasappa. Process of drilling glass appeared in November 1923 issue. An article on candle making appeared in December 1922 issue. Paraffin is obtained by distilling tar and beech wood. Recipes of pomade will be found in September, 1924 issue.

3532 V. Subbaramyer. Advertise in the pages of news paper and periodicals.

3533 B. N. Banerjee. Soda water machines may be supplied by Little & Co., 9, Grants Lane, Calcutta.

3534 A. J. Hurst. For books on pyrotechnics write to Thacker Spink & Co. 3, Esplanade East, Calcutta. For sulphur and saltpetre write to Surendra Nath Daw & Sons, 3, Dayehatta Street,

SWISS MAKE
Guaranteed Watches.
Free Packing, Postage and V. P.
Railway Regulator Rs. 4-6
Wrist Watch Nickel Rs. 5-8
Wrist Watch Rolled Gold Rs. 7-8
Well shaped, Beautiful and Accurate.
LICHO WATCH CO., Bombay No. 4.

The Ideal Cooker.
FOR THE HOME
New manufacturers, cheaper prices & larger output are our aims.
Illustrated Catalogue free.
ANNAPURNA COOKER CO
No. 1A, P.O. Thalakwadi,
Belgaum, M.S.M. Ry.

Barabazar and Akhoy Kumar Dutt & Sons, 2, Banstala Street; both of Calcutta.

3535 Sadashivrow Deovanka. Refer your query to some shipping agents of Bombay.

3536 G. V. Subramanyam Chetty. You may try the recipe at first. Two cells means two electric cells.

3537 Tarak Das Banerjee. Recipe of tea tablets will be found in July, 1923 issue. Your idea is not workable.

3542 Karam Singh Gulhati & Co. Process of boiling linseed oil appeared in February issue. An article on boot polish manufacture appeared in June, 1923. Recipes of pomade will be found in September, 1924 issue. Process of preparing sauce appeared in March, 1923 issue. Boneblack is charred bone dust. Process of refining til oil will be found in the book. Please refer to Dirctory of Reference appended to the book.

3544 A. J. Dastur & Co. Recipes of Eau de Cologne appeared in September, 1924 issue.

3545 K. S. V. Nath. For lead foils and capsules write to B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta.

3546 Chhuttan Lal. The article will appear in an early issue.

3547 The Henbane. Your previous letter is missing, please reapeat your queries.

3549 P. R. Doraisawmy Moddaliar. We cannot help if advertisers do not respond to your letter.

3551 B. Govindasawmy Chetty & Sons. An article on the manufacture of artificial silk appeared in the last June issue. You may use glass cement for cementing broken pieces of glass. Formula of the same will be found in September, 1922 issue. German dyes may be supplied by Aminchand Mehra & Sons., 34, Armenian Street, Calcutta. For silver lace try H. Ahmad Hasan Allawalla, 69, Khengraputty, Calcutta.

3553 Nur Ahmed. Your query being more mechanical cannot be answered in these columns.

3556 K. Souri Rajan. Please go through April, 1924 issue of INDUSTRY which deals exhaustively with the rice industry of India.

3558 M. A. Khan. For engraving on steel and bottles you will have to use special instruments made for the purpose.

3559 Abdur Rashid. Keep the *khoa* in vaccum packed tin cantainer and see what follows.

3565 Mahbub Ali Khan. No more particular is available of fescolizing.

3567 Dewan Chand Bawni. Composition of cobra appeared in May, 1922 issue. See No. 3542.

3568 Chandra Guna. In melting iron large furnaces are required. Waterproof cloths are manufactured by Suffina & Co., Chandni Chowk, Delhi and Bengal Waterproof Works, 2, Nazarali Lane, Calcutta. Tablet making machines may be supplied by Calcutta Industries Ltd., 71, Canning St., Calcutta.

3571 B. B. Hardikar & Bros. You may correspond with B. K Paul & Co, 1-3, Bonfields Lane, Calcutta for selling sodium sulphate.

3573 K. Appu Rao. Receipes of pain balm will be found in December 1922 issue. A formula of aluminium cement will appear in an early issue.

3575 Sri Sita Rama. Formula of lemon oil will appear in an early issue.

3577 H. K. Chowdhury. You may correspond with Commercial and Service Bureau, Bareilly. Advertise for selling ivory and elephant's bone.

3578 A Subramaniam Chetty. You are to ascertain quantities by trial.

SETT DEY & CO

ORIGINAL HOMEO PHARMACISTS.
42, Strand Road, Calcutta,
Dealers in Original Homoeopathic dilutions and Biochemic Triturations.
Catalogue Free on Application.

3579 Kochukutti Padmanabhan. Thacker's Indian Directory to be had of Thacker Spink & Co., 3, Esplanade East, Calcutta and Business Directory of India, Burma and Ceylon published by Business Directory Co., The Kanara Press Bldgs, Madras may serve your purpose. Sewing machines may be supplied by Singer Sewing Machine Co., Esplanade, Calcutta.

3581 M. N. Nair. Palm oil and other oils you require may be bought of P. Mukherjee & Co., 28-29, College Street Market, Calcutta. Soap stone may be supplied by A. H. Bose, Madhupur, E. I. Ry and Varman Brothers, Alwar, Rajputana.

3583 A. Lal & Co. You may go through The Far Eastern Review, 16, Jinkee Road, Sanghai, China. Address of journals of other two countries you require is not known.

3584 Durgi Dharmaiah Chetty & Sons. We do not deal in any article, we only give information. Yarns for knitting may be bought of E. B. Bros & Co. 11 Dharamtala Street, Calcutta.

3587 Royal Advertising and Manufacturers' Agency. For starting film industry you should engage an expert who will advise you on your difficulties. In India there is no other technological journal expept INDUSTRY. The Bioscope, 15 Shaftesbury Avenue, London W. 1 ; The British Journal of Photography Published by Henry Green-Wood & Co. Ltd. 24 Wellington Street, Strand, London W. C. 2 and Ice and Cold Storage, 20 Tudor Street, London E. C. 4 may serve your purpose. You will have to invest not less than Rs. 100,000 for starting cinema film industry. For machines and other mrterials enquire of Kodak Camera Ltd, Chowringhee, Calcutta.

3591 Ram Shanker & Co. For various kinds of engraving you should read some books and should some practical training. The books may be supplied by Thacker Spink & Co., 3 Esplanade East, Calcutta.

3593 K. V. Kunhiraman. You may try Colombo Book & Stationery Stores ; W E. Bastain & Co. Pettah and Plate Ltd, Colpetty ; all of Colombo, Ceylon.

3594 G. Ananda Rao Iyer. We cannot agree to your proposal. For starting any business please go through New Idea columns of INDUSTRY.

3595 D. P. Sinha. Refer to No. 3594 above.

3597 N. K. Lal. There is no such book.

3599 N. J. Dave. First of all read some books on tea industry. Books may be bought of Chakraverty Chatterjee & Co. Ltd, 15 College Square and Thacker Spink & Co, 3 Esplanade East ; both of Calcutta.

3601 J. M. N. Kulshresth. For oil engines write to B. D, Bery & Co. 43 Ripon Street, Calcutta. Reply to your queries appeared in February issue under No. 2983.

2603 Remella Sambasina Rao. Colours may be supplied by Ludwig Ellerhusen G, m. b. H. Hamburg 24 ; Griessdorf & Rabe, Reichenbach 3 and Heinrich Ohle, Hamburg ; all of Germany.

3604 Iqbal Hussain. For the required book write to Thacker Spink & Co. 3 Esplanade East, Calcutta.

3605 R. S. Shotriya. Photo goods may be supplied by Calcutta Camera, House, Chowringhee, Calcutta. Electrical goods may be bought of Mukherjee Bros, 6A Boloram Ghosh Street, Shambazar and McLaurie & Co. 17 Ezra Street ; both of Calcutta. Process of constructing batteries appeared in March, 1924 issue.

Limitation of Family.
Third Ed. 5 Portraits, 55, Engravings.
357 Pages, Price Rs. 3. Postage extra.
A comprehensive and Confidential Treatise. Every parent desiring to regulate the number of children according to his health and means will find it a god send, ask for table of detailed contents, which will be sent free. K. M DAS & CO.,
29-1, Telepara, Sampooker St., Calcutta.

Recipes of furniture polish will be found in November, 1923 issue.

3606 A. K. Subramaniam. For marble toys try K. B. Nun, 234, Old China Bazar Street, Calcutta.

3608 Har Dayal Churamani. Please try the formula first and see what follows. In many cases manufacturing on a small scale does not prove profitable. If you cannot secure the ingredients locally you must try elsewhere.

3611 Ram Datt Joshi. Please refer your query to Bengal Scientific Supplies Co., 29-30, College Street Market, Calcutta.

3612 Mg. Tun Aung. For particular please write direct to the firm.

3614 The Kangudi Textile Co. Take legal advice.

3615 Hardwarmul Srilal. There is no acid known that is used in tempering steel. For rice hullers enquire of the Engelberg Huller Co., Syracuse, New York, U. S. A, For glazing rice you are to use glazing drums which may be supplied by Koerber and Naumann—Maschinenfabrik U. Muhlenbaunstalt, Hamburg, Billbrook, Germany. Rice mill machineries may be supplied by Douglas Grant Ltd, Kirkcaldy, Scotland; Mc. Kinnon & Co., Aberdeen, Scotland; Hind & Lund, Preston, England and F. H. Schule G m b H. Hamburg, Germany.

3618 J. N. Opal. Address of calendar manufacturing companies will be found elsewhere in these columns. Rubber balloons may be supplied by Cincinnati Rubber Mfg. Co., Cincinnati, Ohio, and Philadelphia Rubber Works, Philadelphia, Pennsylvania; both of U. S. A.

3619 N. V. Bhagant. For particulars of the joint-stock companies referred to by you write to Registrar Joint-stock Co., Government Place, Calcutta. For selling shares and buying new ones write to Calcutta Share Broker's Syndicate Ltd, 2 & 3, Lall Bazar Street, Calcutta.

3620 Po Thaing. 4 parts collodion should be dissolved in 100 parts water.

3624 M. S., Kalsy. You may write for sample copy of Ubersee Post, 10, Solomonstrasse, Leipzig, Germany. Addresses of other foreign journals appear elsewhere in these columns.

3626 Jaswant Rai Ramta. For the list of industrial exhibitions held in different provinces of India write to the Director of Industries of those provinces. China clay may be supplied by Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta. Saltpetre toys cannot be made stiff. You may have the tools prepared from a local workshop as per order. For tools correspond with Karatsu Iron Works Ltd., Nishi-karatsee, Hizen and Kawahashiya & Co., 25, Nichome, Sakaicho Yokohama; both of Japan.

3627 Balmokand Sethi. A good recipe of luminous paint appeared in November, 1922 issue.

3628 Narayan Setty. Please seek legal advice. No special licence is requied for selling caustic soda. A good bug killer is benzine. It evaporates quickly but the vapour is very inflammable. Or add a quart of spirit of turpentine to half a gallon of kerosine oil. Then mix with an ounce of oil of penny royal. This mixture is less dangerous but in no way less efficacious. For clocks try West End Watch Co., Dalhousie Square East, Calcutta.

3629 B. S Rahim Collapsible tubes may be supplied by Vanesta Ltd., Great Tower Street, London E. C. 3. For litho stones try Prabhakar & Co., Bazar Sq, Sagar, Shimoga and The Litho Stone Mfg. Co., 118-3, Kalasi Palyam, Bangalore Blocks are prepared by Fine Arat Printing Syndicate, 147 Baranasi Ghosh Street, Calcutta.

German Aniline Dyes, and Chemicals of the well-known manufacturers—

Messrs. Leopold Cassella & Co.,

Largely consumed by big Industries, such as Jute, Silk, Cotton, Wool, Leather, Paper, Inks etc.

—STOCKISTS—

Messrs. Fazlehusein & Brother,

44, Armenian Street, Calcutta.

3630 A. S. A., Pillay. German picture post cards may be bought of Ram Brothers, 853-31, Burns Road, Karachi and Calcutta Commercial Bureau, Kalighat, Calcutta.

3633 Hanuman Pershad. For books on soap making write to Chakraverty Chatterjee & Co, 15, College Square, Calcutta. For soap moulds write to S. A. Manan, 82, Machua Bazar Street, Calcutta.

3634 G. C. Mull Burman. Small wooden boxes known as *dibea* may be bought of A. Krishmann & Co., 6, Gauribarea Lane, Shambazar, Calcutta.

3635 R G Hondikar. For tin plate printing enquire of Calcutta Tin Printing Works, Post Box 6772, Calcutta.

3637 A. R. Subbanarasa Ayyer. For glass phials enquire of Calcutta Glass and Silicate Works, 101, Cornwallis Street, Calcutta and S. K. Dey, 124, Shova Bazar Street, Calcutta.

3639 C. Bhagwandas. For packing boxes write to Ram Chunder Tatt, 10, Ram Kristopur Ghat, Howrah Road, Howrah.

3640 M. Sankar. For medical books try Butterworth & Co., 8, Hastings Street, Calcutta.

3642 T. Kesavan. For industrial books try Chakraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta. There is no such school known where tailoring is taught by postal course. The Outfitter published from 5 & 7, Moor Lane, London E C. 2 deals with the whole outfitting trade. The following is a list of tailors of U. S A. (1) John Patterson & Co., New York; (2) J. C. Platt Clothing Co, New York and (3) Stein Bloch Co., Rochester, New York.

3643 K. Ariyanayakam. It is not possible to give the list of all philatelic journals of India. You may however write to The Philatelic Journal of India, The Mall, Lahore and The Philatelic Magazine, 87, Emmanuel Road, London S. W. 12 for sample copies. Refer your other queries regarding philatelic to The Philatelic Society of India, 15, Burrows Street, Fort Bombay.

3645 K. Narayanaswami. For goldsmith's tools write to Messrs A J. Soor & Co, 233, Upper Chitpur Road, Baghbazar, Calcutta. For the required machine try T E. Thomson & Co. Ltd. 9, Esplande, Calcutta.

3649 V. A. S. & M M. E & Co. Cardboard boxes may be bought of Bengal Cardboard Box Mfg Co, 64-1, Machua Bazar Street and Kundu & Dass, 20, Gour Laha Street; of Calcutta. Soap chemicals may be had of Calcutta Chemical Co Ltd., 35-1, Panditia Road, Ballygunge, Calcutta.

3650 Nalini Mohan Chatterjee. Process of preparing aluminium solder will appear in an early issue. For preserving syrups use rectified spirit in quantities given in the Book on Syrup Manufacture. In case of *morobba* also use the some thing.

3651 M. G., Deen & Co. Sheet metals may be supplied by Siegfeld, Arno, Berlin W. 30 and Martin Lebrecht, Nurnberg; both of Germany.

3652 R P., Raju. Yarns may be bought of E B. Bros & Co, 11, Dharamtala Street, Calcutta and R M. Jassawala & Co., 3-13, Apollo Street, Bombay. For list of cotton mills of India consult Thacker's Indian Directory.

3653 N. P. Kabaridasam. An article on mirror making will appear in an early issue of INDUSTRY. Consult stove makers and repairers. Fly killers may be bought of Singh Sarkar & Co, 125, Harrison Road, Calcutta. For the required essence try B K. Paul & Co., 1-3, Bonfields Lane, Calcutta. For your 2nd query seek medical advice.

3654 Lajpat Rai Sahni. For bristles enquire of Bonner & Co., 202, Cornwallis Street; Indian Bristles & Lard Supply Co, 31-1, Tangra Road; both of Calcutta. The above firms will supply you with necessary information.

3655 Mahamad Khalilur Rahman. You may use copper blocks. It is not possible to copperplate the blocks of lead.

3657. Pad Kripar Ltd. To communicate with any querist write him with number and name under care of INDUSTRY when your letters will be duly redirected.

3658 J. Ahmed. For tacks write to The Shelton Tack Co., Shelton, Connecticut and Tower Mfg. Co., Cincinnati, Ohio ; both of U. S. A.

3659 G. L. Narayan Reddi. You may gild the watch case. The process will be found in April 1923 issue.

3660 Prakash Ch. Sircar. The address of Government School of Art is 18 Chowringhee, Calcutta. The offices of Directors of Industries of various provinces are situated at headquarters of the provinces.

3661 Nanbat Rai. Your query regarding verdigris appear in Formula, Processes columns of this issue. You should use platinum in very small quantity. Give a trial to the formula and see the result.

3664 Illegible. For starting business with small capital go through New Idea columns of INDUSTRY.

3665 U. C., Sharma. Formula of face cream will be found in July 1924 issue. Picture post cards may be bought of B. M Malabari, 3, Nilmadhab Sen Lane and Majumdar Agency, 64, Mechua Bazar Street ; both of Calcutta. Oil engines may be had of B. D. Bery & Co., 43, Ripon Street; and Alfred Herbert Ltd., 13, British Indian Street; both of Calcutta. Flour mills may be supplied by Burn & Co., 7, Hastings Street, Calcutta. Rice mills may be bought of Marshall Sons & Co. Ltd., 99, Clive Street, Calcutta.

3666 P. C. Sircar. An article on phenyle manufacture appeared in October, 1921 issue. A recipe of glass cement will be found in October, 1923 issue.

3667 Govindram Chawla. Your queries are engaging our attention.

3668 K. Ponnuswami. Formula of saccharin appeared in June 1923 issue.

3569 Mahesh Chandra. One minute cameras may be bought of E. Soloman, Kenderdine Lane, Calcutta. Enamelling cycle handles appeared in November 1922 issue. For other addresses please go through the advertising pages of INDUSTRY. Materials required in surgery may be had of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta ; J. Holmes & Co., 10, Broadway, Madras and P. Basten & Sons, 37, Nicholson Road, Lahore.

3071 K. P., Thakur. For particulars of the company write to the Registrar, Joint Stock Companies, Government Place, Calcutta.

3672 Mohffay & Sons. To dispose of the articles you deal, advertise in the pages of newspapers and periodicals.

3673 A. Paul. There is no such school known to us.

3674 V. Meera Mohideen Brother. Candle making apparatus may be supplied by Calcutta Industries Ltd., 71, Canning Street, Calcutta.

3675 Kasim Ali. Your query is outside the scope of INDUSTRY.

3677 W. N. S., Aserappa. For the required novels enquire of Book Co. Ltd., 4-4A, College Square and Thacker Spink & Co., 1-3, Esplanade East ; both of Calcutta. Fountain pens are repaired by Hilton & Co., 109, College Street and Surendra Nath Nag C/o Nag Bros., 204-2, Cornwallis Street ; both of Calcutta. For the required fountain pens write to Nilmony Halder & Sons, 106, Radhabazar Street, Calcutta.

3678 Ramanlal M. Parekh. Please refer your query to Student's Information Bureau, 617, Kasba Peth, Poona City.

3680 K. & J. Hills. For particulars of the machines write direct to the respective parties.

3681 Sri Mahant Biragi. The addresses you require are not available.

3683 M. Ranya Row. Glasses may be supplied by Fatic Lall Seal & Sons, 10, Swallow Lane, Calcutta.

3684 S. R. N. Row Naidu. For analysis write to Government Observatory, Colaba, Bombay.

3685 Ramshanker & Co. Information regarding monazite sand will be found in August, 1923 issue, Process of washing silk will appear in an early issue. Gold and silver threads may be supplied by Dahyabhai Jagjivandas Jariwala, 37, Bhendi Bazar, Bombay; Tribhunvandas Vullabdas Jariwalla, Rampura, Surat.

3686 P. Swamy. For collapsible tubes try B. K. Paul & Co., 1-3, Bonfield's Lane, Calcutta.

3690 S. K. Sankarvarayana Pillai. For industrial books enquire of Chakravertty Chatterjee & Co. Ltd., 15, College Square and Thacker Spink & Co., 3, Esplanade East; both of Calcutta.

3691 Dr. Shaik Imam. Please explain clearly your requirements.

3692 J. N. Joshi. Refer your first query to Asiatic Society of Bengal, 1, Park Street, Calcutta. A simple recipe of glass cement appeared in October, 1923 issue. For a list of technical institutions of your province write to the Director of Industries of your province.

3693 Pranshanker G. Dave. Deodorization of kerosine oil is a very difficult process involving many intricacies. Your other two ideas are not feasible.

3694 J. R. Ramta. Reply to your queries appears elsewhere in these columns.

3696 Misri Flute Co. For harmonium reeds, etc. enquire of T. S. Ramchander & Bros., Kalbadevi Road, Bombay; T. E. Bevan & Co. Ltd., 21, Old Court House Street, Calcutta; Dwarkin & Son, 8, Dalhousie Square, Calcutta; Boosey & Co., 259, Regent Street, London W. 1, and John Zum Felde & Classen, Hamburg, Germany.

3697 P. N. Sanyal. Refine the *til* oil according to the process given in the book.

3699 Mohanlal Dasabhai Dave. For corrugated cardboard enquire of Guildhall Corrugated Paper Co., Birmingham, England. Ink pots of required description may be supplied by Parry & Co., 11, Clive Street, Calcutta.

3700 V. G. Ramanatham. For mould of required design write to Calcutta Industries Ltd., 71, Canning Street and C. S. Sarcar, 86-A, Narkeldanga North Road; both of Calcutta.

3701 Mg. Fun Aung. The address required by you is not known to us.

3702 Lajpat Rai Sahni. For enquiry regarding ochre write to Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta.

3704 Murrari Lal. Sewing machines may be supplied by Singer Sewing Machine Co. Ltd., 42 & 43. St. Paul's Churchyard, London E. C. 4; American Sewing Machine Co., Ludgate Square, London E. C. 4; Atlas Sewing Machine Co., 182, High Street, Camden Town, London N. W. 1; Wanzaer Sewing Machine Co., 20, Market Place, London W. 1; Standard Sewing Machine Co., Cleveland, Ohio, U. S. A.; Free Sewing Machine Co., Rockford, Illinois, U. S. A.; New Home Sewing Machine Co., Orange, Massachusetts, U. S. A.; Davis Sewing Machine Co., Davon, Ohio, U. S. A.; H. Ahlers & Berg G. m. b. H., Kiel, Germany; Hermann Beier & Co., Karlstrasse, Karlsruhbe, Germany; and States Trading Co., 417, Montgomery St., San Francisco, California.

3705 Phamar Chand Gour. For glass tumblers enquire of Bengal Glass Works, 39, Canning Street; Calcutta Glass & Silicate Works, 101, Cornwallis Street and Nanda Lal Dass & Bros.,

Prevention is Better Than Cure!
"ANTI-MORT-ANT"
(Scientific Solution)
No More Trouble of White Ants.
Try a gallon to-day and see how they die! It has been found out one of the safest and cheapest "Wood Preservative" and prevents all kinds of injurious Pests, which are not generally discovered destroying property until they have done considerable loss. Price Rs 3-8 per gallon, 8 gallon or over Rs 3-4 per gallon, and the sample gallon free at your Railway Station on above cost. Wanted Agents Throughout. **Satisfaction Guaranteed in all respects. Invited Enquiries.**
THE ENGINEERING STORES DEPOT
DELHI.
Tele :—Ekonker. **Phone—5699.**

194, Old China Bazar Street; all of Calcutta.

3706 G. S. & Sons. Take gallnuts 2 lbs.; sulphate of iron 8 oz; gum arabic 4 oz Powder each separately, sift through a cloth mix and use. This powder when mixed with suitable quantity of water, will make a good blue black ink.

3707 O. V. Muthukrishnan. Floral oils may be bought of D. G. Gore, Sayana Bldg., Lohar Chawl, Bombay and Khoda Bux, 7, Colootola Street, Calcutta. Cardboard boxes may be supplied by H. L. Sett & Sons, 6-1, Nilmoney Mitter Street; Bengal Cardboard Box Manufacturing Co., 64-1, Mechua Bazar Street and Dass & Kundu, 20, Gour Laha Street; all of Calcutta.

3708 T. Hanumantha Row Naidu. Wants to be in touch with dealers in tobacco,

3709 E. K. Naidu. As regards registration seek legal advice.

3711 Hazari Lall. You may consult Ink Manufacture by Mitchel to be had of Thacker Spink & Co, 3, Esplanade East, Calcutta. Formula of soap similar to Sunlight Soap appeared in August 1921 issue. You may go through Soap and Allied Industries by H. Dutt to be had of the author at Dutt Villa, Belgatchia, Calcutta. For learning German you may read Easy German Primer by Dr. Pasupathi Nath Sastry to be had of Sen Brothers 15, College Square, Calcutta. Both iodine and aluminium are not manufactured in India.

3713 Mostape Zafart Cousin. To sell articles stocked by you please advertise in the pages of newspapers and periodicals.

3715 Kewal Ram Jhamanlal. For hardwares such as iron bars, steel plates etc. enquire of Anandaji Haridas & Co., 20, Darmahatta Street and Balmer Lawrie & Co., 103, Clive Street; both of Calcutta. The following are the hardware merchants of Europe; (1) E. Berneelts & Co., Bassen Kathudik 9, Antwerp, Belgium; (2) Prist Prosper & Co., Rue Guard 14, Antwerp, Belgium; (3) Willems et Cie, Rue du Marche on Carbon, 71, Brussels, Belgium; (4) Newton Fairclough & Co. Ltd, 2, Oliver's Yard, City Road, London E. C. 1; (5) Hardware Distributors Ltd., Vicarage Road, Lye, England and (6) Corts Ltd, Silver Street, Leicester, England. Piece-goods are manufactured by Balstone Cook & Co Ld, Temple Bldgs, 17, Altrincham Street, Manchester; Bankside Manufacturing Co. Ltd., Manchester Road, Rochdale; Broome & Foster Ltd., 17 & 19, Charlton Street, Manchester and Burton Reuben Ltd, Parkfield Mills, Nelson; all of England.

3717 Ramchandra Rau. The following is the list of some of the electrical and mechanical institutions: (1) Bengal Engineering College, Shibpur, Howrah; (2) Bengal Technical Institute, Jadabpur, 24 Parganas; (3) The College of Engineering, Madras; (4) The College of Engineering, Poona, (5) The Thomason College, Roorkee, and (6) The Government School of Engineering, Insein, Burma. For detailed list and a list of industrial schools write to the Directors of Industries of the various provinces

3720 Shyam Lall Shayam Kuman. There is no such handy book which gives Hindi, equivalents of drugs, herbs etc. You may try Commercial Products of India by Sir George Watt to be had of Chakraverty Chatterjee & Co, Ltd., 15, College Square, Calcutta. You may write to the Editor, The Chamber of Commerce Journal of Yokohama, 5, Hanche, Itchome, Yokohama, Japan.

Note.

The following corrections should be made in the article on Mulberry Silk Industry in the February issue:—Page 528, 2nd column line 29 after the word 'plucked' add '8 or 9 months after planting, but leaves from the second and third systems of plantation can only be plucked' Page 530, 2nd column line 36 after the word 'done' omit 'also.' Page 531, 2nd column line 16 after the word "for" add 'over'.

NOTICES, AND REVIEWS.

Brojo-Bilas Taila.

Messrs. Mukherjee Brothers & Co., of 17-19, Shambazar Bridge Road, Calcutta have sent us a phial of their Brojo-Bilas Taila. We recommend this nicely scented and efficacious hair oil to our readers for a generous trial.

Glass Buttons.

The glass buttons we have received from The Pioneer Beneficial General Agency, Khara Dhar, Kagzi Bazar, Karachi, are decent and attractive and may be used for sleeves and coats.

Calendars.

Our indebtedness is due to Messrs. The Limaye Bros. Ltd., 5, Pollock Street, Calcutta in respect of a long calendar with copious illustrations of tools, Myer pumps, etc.

We have received from Messrs. Gop Brothers, Cawnpore, U. P. a small table calendar.

Vienna International Fair.

We are extremely gratified to learn that an Indian Firm to wit Messrs. Mohan & Co. of 2, Jagadish Nath Roy Lane, Calcutta has been appointed representative of the Vienna International Fair for Exporters, Importers and Manufacturers, which is held twice a year in March and September. We learn from a descriptive pamphlet that, "It is the largest sample fair in Central Europe in regard to articles *de luxe*. There is, however, a large exhibition of all other sorts of articles as well, and technical novelties from all countries of the globe are on show. Fifteen countries have been exhibiting at the Vienna Fairs while 12,0000 purchasers from 60 different countries have filled their requirements at the Exhibition." When some tangible results have been attained by exhibiting Indian artwares in British Empire Exhibition we would like to see enterprising Indians to present a representative collection at this Fair thereby attracting world-wide notice.

An Indian Journal from Berlin.

It speaks volume in favour of the enterprising habit of educated Indians to conduct a progressive journal from Germany with the avowed object of promoting India's industrial development and foreign trade relations. We refer to the Industrial Review for India which owing to certain unforeseen circumstances had to cease publication for some time. It is reassuring to know that the journal has been revived under the title of Industrial and Trade Review for India. We are pleased to find that in its new form, which is very elegant and attractive, the Review maintains its old standard. Indeed it seems to be more useful to business men. There are a number of very useful articles on subjects—industrial and commercial. The contributions are all written from a practical point of view and as such contain valuable information.

It is announced that the Review is henceforth to appear as a fortnightly. It is now issued from Berlin-Charlottenburg, Reichsstrasse 104.

Trade Enquiries.

[To communicate with any party address by name and number under care of INDUSTRY when the letter will be duly redirected]

3384 Kishin Chand Tarachand Johvani.—Can paste notices and posters or advertising papers on the walls of station platforms.

3385 A. G. Rosari.—Desires to be introduced to purchasers of dried areca-nuts and dried casava roots in Calcutta.

3409 Moulauvi J. H. Sarkar.—Wants addresses of wholesale dealers of eggs of Chittagong fowl in Calcutta and other places.

3412 W. & D., Lennox Harwood.—Can supply pure ghee in large quantities.

3418 Nalini Kanta Ghosh.—Wishes to learn where "Shonapoka" or "Kanchpoka" (used by women on forehead) can be originally found and is willing to hear from first-hand dealers of the same.

3438 M. Soleman.—Wants to have the services of a soap expert.

3456 Gatulal P. Vathak.—Asks advice regarding construction of Artesan Well.

3473 Dwarka Das.—Wants to purchase Munj cord making machines.

3483 P. Ch. Mahadeva Sabez.—Will any of our reader inform him whether there is any French institution where students are admitted free or allowed stipends ?

3487 S. V. Bhogle.—Wants to be an apprentice in a good mechanical work-shop or in paper mills. Will any of them help him !

3495 Moniruddin Ahmad Khan.—Desires to know the name and address of the sole importer of Corona Portable Typewriter.

3498 Williamson & Co.—Want addresses of proprietors of iron ore mines of Dewalgaon, Manbhum and Singhbhum and of supplier of iron ore.

3510 V. S. Williams.—Desires to be introduced to suppliers of pig and crocodile skin.

3523 Kakkirala Somanna & Sons.—Can supply wooden toys and small wooden boxes.

3524 Chhaganlal Burad.—A Marwari graduate having experience in State works seeks service in a business firm or in a native State.

3541 B. Walters.—Can supply forest products.

3554 H. S. Bhattacherjee. Can supply *Datina mukta.*

3572 Kamruddin Umarmia. Wants a capitalist to invest Rs. 10,000 to Rs. 15,000 in lime clay of red, blue and yellow colours.

3582 Manoharaj. Wants a capitalist to start a profitable business,

3585 Yossoof Abdul Aziz & Co. Want to be put in touch with importers of American rosin.

3586 C. C. Mitter. Wants a capitalist to invest in a mineral business.

3596 A. Srivasa Rao. Desires to be put in touch with raw lac suppliers in Madras Presidency.

3613 M. C. Merchant. Wante to be put in touch with suppliers of wild animals.

3631 P. Devadasan, Po. Box 213, Singapore.—Is ready to sell the copyright of book on Rubber Co, and accounts.

3644 G. John Thathayya & Sons.—Desire to be introduced to lace dealers of foreign countries.

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Manager, INDUSTRY OFFICE,
Shambazar, Calcutta.